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Baseline Study of Malaria Infection in Four Rural Communities of Ogun State

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ABSTRACT

Malaria infection is one of the most commonly reported illnesses in Nigeria. Studies reporting malaria infection at the community level is deficit in Ogun state, Nigeria, hence this study investigated the prevalence and risk factors associated with malaria infection in four rural communities, in Odeda LGA, Ogun State, Nigeria between May 2011-2012. Blood samples were collected from already consented members and questionnaires were administered concurrently. Microscopic examination of the blood samples were carried out. A total of 405 subjects was examined, 236 (58.3%) were positive for malaria parasite, in which 92 (39%) were male and 144 (61%) were female ($p = 0.980$). Age group 6-19 shows highest infection with 73 (30.9%) subjects and the least infection is recorded amongst the 56-70 age group with 20 (8.5%). There was a significant relationship between age group and prevalence of malaria among subjects studied ($p < 0.05$). By education, 110 (46.6%), 87 (36.9%), 37 (5.7%) and 2 (0.8%) of the infected subjects had primary, no formal, tertiary and secondary education, respectively. Literary status has no influence on infectivity amongst subjects ($p > 0.05$). By occupation majority of the infected subjects were students 84 (65.1%), while the least infected group were artisan and civil servant with 3 (1.3%) and 3 (1.3%), respectively. There was no significant relationship between occupation and infection of malaria parasite ($p > 0.05$). This study shows that malaria is endemic in these communities, infection is highest in lower age group subjects and hence there is need for measures to be put in place for its prevention.

Key words: Baseline, community, malaria, ogun, Nigeria

INTRODUCTION

Malaria infection is caused by *Plasmodium* species, and is transmitted through mosquito's bites from female *Anopheles* species (Epidi *et al.*, 2008). It is the most prevalent disease with 300-500 million clinical cases occurring every year and over 1.2-2.7 million deaths (Sachs and Malaney, 2002). Majority of these cases occur in Sub-Saharan Africa. Pregnant women, infants and young children below age five are the most vulnerable as a result of compromised and immature immunity, respectively (Carter *et al.*, 2005). Principal symptoms of the infection includes malaise, fever, headache, chills and sweats, other symptoms might be present either as a respiratory or gastrointestinal illness. In cases of uncomplicated malaria, respiratory symptoms are also frequent (Anstey *et al.*, 2002). Statistics has shown that malaria accounts for 25% of under-five mortality, 30% of childhood mortality and 11% of maternal mortality in Nigeria (Federal Ministry of Health FMH, 2000, 2005). Reduced community productivity, household productivity and

significant rise in household expenditure for seeking treatment and preventive measures are indirect and direct outcome of malaria infection, respectively (Attanayake *et al.*, 2000). Despite these known facts, studies reporting malaria infection at community level in Ogun state is deficit where majority of the reported studies are hospital-based. Community specific interventions for malaria can be designed with the use of available location specific data (Abdullahi *et al.*, 2009), which are lacking in these communities. Hence there is need to provide a baseline data on the magnitude of malaria infection and factors associated with it in Ogun State which would assist in direction of intervention tools. This study therefore reports the magnitude of malaria infection and associated risk factors in some selected rural communities of Ogun State, Nigeria between May 2011-2012.

MATERIALS AND METHODS

Study location: This study was carried out in four randomly selected rural communities namely Ijemo Fadipe, Obete Abopa, Obete Akanbi and Odeda. These communities are located in Odeda Local Government Area (LGA), Ogun State. The local government area is adjacent to Abeokuta, the capital city of Ogun State. The LGA is located in the forest zone of southwestern Nigeria.

Ethical consent: Prior to the commencement of the study, an ethical approval was obtained from the Odeda Local Government Area Primary Health Care centre. The head of each community was informed about the study and members of the community were informed as well by their community leaders. Informed members of the community that volunteered to participate in the study were given consent form.

Sample collection: Finger pricked blood samples were collected using a sterile lancet from consenting members in each community, blood smear were collected on a clean grease free microscopic slide and labeled accordingly. The collected blood samples were analyzed within 1-2 h of collection. Thick films were prepared according to the technique outlined by Cheesebrough (2004) and described by Eparti *et al.* (2008).

Questionnaire administration: Well structured questionnaires were administered to consenting members, demographic and socio-economic data were collected.

Data analysis: The data generated from this study were analysed using SPSS 16.0. Associations between the malaria *Plasmodium* prevalence and the subjects' variables were ascertained. Confidence level was set at $p = 0.05$.

RESULTS

A total of 405 persons participated in the study. Out of the 405 (100) persons that participated in the study, 243 (60%) were female and 162 (40%) were male. Table 1 show the demographic and socio-economic characteristics of the persons who participated in the study. The study revealed 236 (58.3%) malaria infections among the 405 (100) persons who had provided a blood sample (Table 2). Table 3 shows infection by sex, 144 (59.3%) females tested positive for malaria parasite, while 92 (56.8%) males tested positive for malaria parasite. Majority of the persons who tested positive for malaria parasite belong to the 6-19 age range 73 (30.9%), while the least infection is recorded among the 56-70 age group with 20 (8.5%). There is significant relationship between the age group and prevalence of malaria ($p < 0.05$) (Table 4). By education, 110 (46.6%) of those that

Table 1: Demographic and socio-economic characteristics of the four rural communities in Odeda lga, Ogun state, Nigeria

Community	Ijemo Fadipe	Obete Abopa	Obete Akanbi	Odeda	Total
Sex					
Male	56 (39.2)	26 (38.2)	50 (46.3)	30 (34.9)	162 (40)
Female	87 (60.8)	42 (61.8)	58 (53.7)	56 (65.1)	243 (60)
Total (n)	143 (100)	68 (100)	108 (100)	86 (100)	405 (100)
Age group					
1-5	6 (4.2)	2 (2.9)	4 (3.7)	23 (26.7)	35 (8.6)
6-19	38 (26.6)	14 (20.6)	27 (25.0)	30 (34.9)	109 (26.9)
20-30	14 (9.8)	17 (25.0)	12 (11.1)	20 (23.3)	63 (15.6)
31-45	25 (17.5)	13 (19.1)	15 (13.9)	3 (3.5)	56 (13.8)
46-55	21 (14.7)	6 (8.8)	20 (18.5)	5 (5.8)	52 (12.8)
56-70	16 (11.2)	8 (11.8)	16 (14.8)	4 (4.7)	44 (10.9)
>70	23 (16.1)	8 (11.8)	14 (13.8)	1 (1.2)	46 (11.4)
Total (n)	143 (100)	68 (100)	108 (100)	86 (100)	405 (100)
Education					
Primary education	62 (43.4)	24 (35.3)	42 (38.9)	44 (51.2)	172 (42.5)
Secondary education	28 (19.6)	7 (10.3)	11 (10.2)	22 (25.6)	68 (16.8)
Tertiary education	-	1 (1.5)	-	3 (3.5)	4 (1.0)
No formal education	53 (37.1)	36 (52.9)	55 (50.9)	17 (19.8)	161 (39.8)
Total (n)	143 (100)	68 (100)	108 (100)	86 (100)	405 (100)
Occupation					
Farmer	62 (43.4)	19 (27.9)	38 (35.2)	7 (8.1)	127 (31.4)
Trader	10 (7.0)	17 (25.0)	13 (12.0)	11 (12.8)	50 (12.3)
Civil servant	-	-	1 (0.9)	4 (4.7)	5 (1.2)
Student	49 (34.3)	7 (10.3)	34 (31.5)	39 (45.3)	129 (31.9)
Business	1 (0.7)	3 (4.4)	-	1 (1.2)	5 (1.2)
No occupation	21 (14.7)	22 (32.4)	22 (20.4)	20 (23.3)	85 (21.0)
Artisan	-	-	-	4 (4.7)	4 (1.0)
Total (n)	143 (100)	68 (100)	108 (100)	86 (100)	405 (100)

Table 2: Prevalence of *plasmodium* infection in the four rural communities in Odeda lga, Ogun state, Nigeria

Community	Prevalence of <i>plasmodium</i> infection		
	Positive (%)	Negative (%)	Total (%)
Ijemo Fadipe	76 (53.1)	67 (46.9)	143 (100)
Obete Abopa	26 (38.2)	42 (61.8)	68 (100)
Obete Akanbi	63 (58.3)	45 (41.7)	108 (100)
Odeda	71 (82.6)	15 (71.4)	86 (100)
Total	236 (58.3)	169 (41.7)	405 (100)

Table 3: Prevalence of *plasmodium* infection by sex in the four rural communities, Odeda lga, Ogun state, Nigeria

Community	No. examined			No. infected		
	Male	Female	Total	Male	Female	Total
Ijemo fadipe	56 (39.2)	87 (60.8)	143 (100)	29 (51.8)	47 (54.0)	76 (53.1)
Obete Abopa	26 (38.2)	42 (61.8)	68 (100)	12 (46.2)	14 (33.3)	26 (38.2)
Obete Akanbi	50 (46.3)	58 (53.7)	108 (100)	28 (56.0)	35 (60.3)	63 (58.3)
Odeda	30 (34.9)	56 (65.1)	86 (100)	23 (76.7)	48 (85.7)	71 (82.6)
Total	162 (40)	243 (60)	405 (100)	92 (56.8)	144 (59.3)	236 (58.3)

Table 4: Prevalence of *plasmodium* infection by age in the four rural communities, Odeda lga, Ogun state, Nigeria

Age group	Ijemo-Fadipe	Obete Abopa	Obete Akanbi	Odeda	Total
1-5	3 (3.9)	1 (3.8)	3 (4.8)	18 (25.4)	25 (10.6)
6-19	23 (30.3)	8 (30.8)	13 (27.0)	25 (35.2)	73 (30.9)
20-30	5 (6.6)	8 (30.8)	5 (7.9)	18 (25.4)	36 (15.3)
31-45	13 (17.1)	2 (7.7)	8 (12.7)	2 (2.8)	25 (10.6)
46-55	12 (15.8)	2 (7.7)	14 (22.2)	4 (5.6)	32 (13.6)
56-70	6 (7.9)	3 (11.5)	8 (12.7)	3 (4.2)	20 (8.5)
>70	14 (18.4)	2 (7.7)	8 (12.7)	1 (1.4)	25 (10.6)
Total	76 (100)	26 (100)	63 (100)	71 (100)	236 (100)

p = 0.033

Table 5: Prevalence of *plasmodium* infection by education in the four rural communities, Odeda lga, Ogun state, Nigeria

Education	Ijemo-Fadipe	Obete Abopa	Obete Akanbi	Odeda	Total
Primary education	36 (47.4)	9 (34.6)	27 (42.9)	38 (53.5)	110 (46.6)
Secondary education	10 (13.2)	4 (15.4)	6 (9.5)	17 (23.9)	37 (5.7)
Tertiary education	-	-	-	2 (2.8)	2 (0.8)
No formal education	30 (39.5)	13 (50.0)	30 (47.6)	14 (19.7)	87 (36.9)
Total	76 (100)	26 (100)	63 (100)	71 (100)	236 (100)

Table 6: Prevalence of *plasmodium* infection by occupation in the four rural communities, Odeda lga, Ogun state, Nigeria

Occupation	Ijemo-Fadipe	Obete Abopa	Obete Akanbi	Odeda	Total
Farmer	26 (34.2)	4 (15.4)	21 (33.3)	7 (9.9)	58 (24.6)
Trader	5 (6.6)	5 (19.2)	7 (11.1)	10 (14.1)	27 (11.4)
Civil servant	-	-	1 (1.6)	2 (2.8)	3 (1.3)
Student	29 (38.2)	1 (3.8)	23 (36.5)	31 (43.7)	84 (65.1)
Business	1 (1.3)	3 (11.5)	-	1 (1.4)	5 (2.1)
No occupation	15 (19.7)	13 (50)	11 (17.5)	17 (23.9)	56 (23.7)
Artisan	-	-	-	3 (4.2)	3 (1.3)
Total	76 (100)	26 (100)	63 (100)	71 (100)	236 (100)

P = 0.08

tested positive for malaria parasite only had education at the primary level while 2 (0.8%) of them had tertiary level of education. There is no significant difference between education and prevalence of malaria ($p > 0.05$) (Table 5). Prevalence by occupation shows that students 84 (65.1%) were the mostly infected among the 236 (100%) persons who participated in the study, followed by farmers 58 (24.6%) and persons without job 56 (23.7%). There is no significant difference between occupation and prevalence of malaria ($p > 0.05$) (Table 6).

DISCUSSION

An overall prevalence of *plasmodium* of 58.3% was recorded from the communities surveyed, with the highest prevalence in Ijemo Fadipe 76 (53.1%), followed by Odeda 71 (82.6%), Obete Akanbi 63 (58.3%) and the least prevalence in Obete Abopa 26 (38.2%). Other non-community based studies reporting malaria prevalence include those of Ojo and Mafiana (2005) with 59.9% prevalence among children <15 years in Abeokuta, Southwestern Nigeria, 51.5% by Epidi *et al.* (2008) among blood donors in Abakaliki, Southeastern Nigeria and 81.5% prevalence was reported by Okonko *et al.* (2009) in a study in Abeokuta, Nigeria. *Plasmodium* prevalence reported in recent studies shows that malaria is still a heavy burden on

the country, despite all that has been done. This study also shows that more females were infected with 59.9% prevalence of *plasmodium* to 40.1% prevalence in males, though there is no significant relationship between infection and sex of the subjects ($p = 0.980$). Findings of Ibekwe *et al.* (2009) and Okonko *et al.* (2009) reported more prevalence in females than males. Hayat *et al.* (2009) reported infection rate to be higher among young adult males in Pakistan. The infected subjects in this study belonged to rural areas of Abeokuta. Studies of Okonko *et al.* (2009) reported *Plasmodium* prevalence among subjects majorly from urban areas while that of Hayat *et al.* (2009) reported prevalence among subjects from rural area. Characteristic of rural-areas such as availability of vector breeding grounds and favourable climatic conditions that promote mosquito breeding and transmission could be attributed to the prevalence of *Plasmodium* among subjects (Okonko *et al.*, 2009). Despite numerous concerted efforts towards controlling the high incidence of malaria in Nigeria, its success has been hindered by reasons such as lack of political will and commitment, low awareness of the magnitude of malaria problem, poor health practices by individuals and communities and resistance to drugs (Sambo, 2007). In addition, the deficit in baseline data reporting malaria infection at the community level also contributes to the improper strategic planning and direction of intervention tools such as Insecticidal Treated Nets, promoting environmental management, rehabilitation of existent health care centres and appropriate awareness programme on the malaria scourge. This study has provided a baseline community data on malaria infection in the selected rural communities surveyed (Odeda, Obete Akanbi, Obete Abopa and Ijemo fadibe) of Abeokuta, Ogun State, Nigeria. However, the conduct of more community baseline study of malaria infection is recommended, as this will assist in strategic planning and direction of intervention tools.

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