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Retrospective Study on the Prevelence of Malaria Parasitaemia Among Sickle Cell Patients in Awka, Nigeria

B. Ogeneh[1], A.O. Ajayi[1] and C.C. Ibekwe[2]

[1]Department of Microbiology, Faculty of Science, Federal University Oye Ekiti, Ekiti State, Nigeria
[2]Department of Microbiology and Biotechnology, Faculty of Natural Sciences, Caritas University, Amorji-Nike, Enugu.

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Sickle cell is a serious genetic health disorder that is common in West Africa. Nigeria has the highest prevalence of sickle cell anemia in the world and it has continued to pose significant health challenges among sufferers and health policy makers; occasioned by the morbidity and mortality always associated with the disease. This retrospective study was carried out to determine the prevalence of malaria parasitemia among individuals with sickle cell anaemia at a private health care facility in Awka, Southeastern Nigeria. Medical records of 92 sickle cell patients and 162 non sickle cell patients were examined between 2006 and 2010. The prevalence of malaria among sickle cell patients was observed to be 14.1%; lower than the prevalence among non-sickle cell patients (89.8%). The incidence of malaria was higher in males (8.7%) than females (5.4%). In this study, the prevalence of malaria reduced with age. There should be continuous surveillance for malaria parasitemia among individuals with sickle cell anaemia.

Key words: Malaria, sickle cell, Nigeria.

The sickle cell disorder is the commonest genetic disorder in the world with a global birthrate of 300,000; and it originates from a dominant homozygous haemoglobin HbSS (Makani *et al*., 2010). This abnormal condition is characterized by rigid sickle shape of the red blood cells of individuals with this condition. The abnormal shape and physiology of the red blood cells of children that suffer from this condition reduces the oxygen carrying capacity of the blood cells and leads to symptoms which include shortness of breath, pains, delayed puberty and jaundice. More serious complications include spleenomegaly, chronic anemia, pulmonary hypertension, and multiple organ failure (NHLBI, 2014). The sickle cell anaemia has consistently posed serious public health concern in sub Saharan Africa, Equatorial Africa, India, Mediterranean and Middle Eastern regions; but the highest prevalence in Sub-Sahara Africa (Oniyangi and Omari, 2006). The estimates of the prevalence of sickle cell anaemia in Nigeria ranges from 25% who are carriers within the population and 3% of the population that are confirmed to be in the homozygous state (Adekile, 1999).

Malaria has historically posed a serious health challenge among populations in Africa and Asia with an estimate of 90% of deaths due to malaria occurring in Africa. Malaria is responsible

* To whom all correspondence should be addressed.
E-mail: aaamicheal11@rocketmail.com

for about 250, 000 cases among children under five and 11% of maternal deaths in Nigeria (Hay *et al.*, 2004). More recent estimates indicate that malaria contributes to 100 million cases per year with 300,000 deaths per year (Nigeria Malaria Fact Sheet, 2011).

It has been noted that the clinical management of the sickle cell disease is complex; although recent advances in medical care of sufferers tends to slightly prolong the life of affected individuals. The nexus between sickle cell anaemia and malaria remains complex but malaria is major contributor to morbidity and mortality among sickle cell anaemia patients (Luzatto, 2012).

This present study seeks to retrospectively examine and analyse clinical data of the Reginae Caeli Hospital and maternity at Awka, Anambra State to determine the prevalence of malaria infections among patients with sickle cell anaemia in Awka City, Anambra State, Nigeria.

Methodology

Study setting

This study was carried out at the Regina Caeli Hospital and Maternity in Awka, Anambra State, Nigeria.

Data analysis of clinical records

Clinical records of patients were obtained between 2006 and 2010 and retrospectively analyzed. The records contain laboratory tests and case notes of patients that attended the hospital within this period. Incomplete records were not used in this study. For the purpose of this study, a case of sickle cell anaemia is defined when the clinical records presents laboratory tests that confirmed that the patient is positive to the sickle cell anaemia.

Overall, 92 complete clinical records of patients confirmed to have sickle cell anaemia were analysed for malaria parasitemia. In addition, records of 167 patients without sickle cell anaemia who attended or were admitted at the hospital at the paediatric ward were analysed as control. All the data for the study population were matched in terms of sex and age (Tables 1 and 2).

RESULTS

Based on sex distribution, 50% of the records with confirmatory cases of sickle cell anaemia were females while 42% were males (Table 1). Among the control, 78 were females while 89

Table 1. Distribution of Sickle Cell Anaemia and non-Sickle Cell Anaemia by sex

S. No	Sex	SCA	NON SCA (Control)
1	Male	40	89
2	Female	50	78
3	Control	92	167

SCA: Sickle cell anaemia

Table 2. Distribution of Sickle Cell Anaemia and non-Sickle Cell Anaemia by age

S. No	Age (years)	SCA	NON SCA (Control)
1	≤ 1year	12	14
2	1-5	19	22
3	5-10	30	74
4	10-15	28	57
5	15-20	3	-
6	20-25	-	-
7	25-30	-	-
8	? 30	-	-
9	Total	92	167

SCA: Sickle cell anaemia

Table 3. Yearly prevalence of malaria among patients with sickle cell anaemia

S. No	Year	No. of Sca Patients Studied	Sca Patients Malaria	Prevalence (%)
1	2006	16	2	12.5
2	2007	19	2	10.5
3	2008	22	4	18.2
4	2009	17	3	17.6
5	2010	18	2	11.1
	TOTAL	92	13	14.1

SCA: Sickle cell anaemia

Table 4. Yearly prevalence of malaria among non-sickle cell patients

S. No	Year	No. of Sca Patients Studied	Sca Patients Malaria	Prevalence (%)
1	2006	28	23	82.1
2	2007	32	30	93.8
3	2008	45	40	88.9
4	2009	32	29	90.6
5	2010	30	28	93.3
	TOTAL	167	150	89.8

SCA: Sickle cell anaemia

Table 5. Distribution of sickle cell anaemia patients with malaria by sex

S/N	Sex	SCA Patients	%	Non SCA patients	%
1	8	8	8.7	69	41.3
2	5	5	5.4	81	48.5
TOTAL	13	13	14.1	150	89.8

SCA: Sickle cell anaemia

Table 6. Age distribution of sickle cell anaemia and non-sickle cell anaemia with malaria

S/N	AGE	SCA patients	%	Non-SCA patients	%
1	≤ 1year	-	-	9	5.4
2	1-5	1	1.1	17	10.2
3	5-10	4	4.3	70	41.9
4	10-15	5	5.4	54	32.3
5	15-20	3	3.3	-	-
6	20-25	-	-	-	-
7	25-30	-	-	-	-
8	e” 30	-	-	-	-
9	Total	13	14.1	150	89.8

SCA: Sickle cell anaemia

were males (Table 1). The highest incidence of sickle cell anaemia was among children between 10-15 years (Table 2). Another major observation in this study was that 13 (14.1%) of the confirmed cases of sickle cell anaemia had malaria comprising of 8 males and 5 females (Table 5). The incidence of malaria among the non sickle cell anaemia cases was 150 (89.9%) (Table 4). The highest number of sickle cell anaemia patients with malaria was between 11-15 years.

DISCUSSION

This study was carried out to determine the prevalence malaria parasitemia among individuals that were confirmed to be suffering from sickle cell anaemia using retrospective data obtained from Reginae Caeli Hospital and maternity between 2006-2009. This study is important for the assessment of any risk that may threaten the life span of individuals suffering from the sickle cell anaemia.

An abridged substantive review of available studies on sickle cell anaemia in Nigeria indicates that the prevalence of the sickle cell anemia is low in different parts of the country but Nigeria has the highest incidence in the world (Nnaji *et al.*, 2013; Afolayan and Jolayem, 2011). Despite this prevalence of the disease in Nigeria, it portends some significance in view of the burden of this disease which manifest in the high cost of care of the affected children, low life expectancy

and the physical and emotional stress which parallels the intensive nature of care that should be given or administered to children with the sickle cell anaemia (Afolayan and Jolayemi, 2011). This present retrospective study agrees with these other studies that have similarly reported low prevalence of the sickle cell disease in Nigeria.

Epidemiologically, the endemic nature of the malaria parasitemia in Nigeria and Africa guarantees that nearly everybody is at risk of contracting malaria including those with sickle cell anaemia (Oniyangi *et al*., 2013). In this present study, 13 children out of the 93 records with confirmed cases of sickle cell anaemia were diagnosed for malaria within the study period. This major finding obtained in this present study agrees with previous works that have increasingly confirmed that malaria is a common disease among individuals and children that have the sickle cell anaemia (Kotila *et al.,* 2007).

Kamugish *et al.,* 2011 reported the coexistence of sickle cell anaemia and malaria among pupils in the peri-urban schools in some districts in Tanzania. Africa has the highest prevalence of sickle cell anaemia worldwide with about 85%of affected births and malaria is viewed as a serious problem among children that are diagnosed with sickle cell anaemia (Williams and Obaro, 2011). The significance of our findings in this present study is significant due to the fact that coexistence of both diseases is always associated with increased mortality and morbidity and malaria is considered a major source of crisis among patients with sickle cell anaemia (Booth *et al*. 2011). In a study by Molineaux, 2001, the prevalence of malaria parasetemia among sickle cell anaemia patients was lower than non-sickle cell anamic patients. It also revealed that protection and immunity against malaria increases with age and this could be attributed to acquisition of immunity later in life. Another important observation in this present study was that children with sickle cell anaemia less than one year did not have malaria. A likely explanation for this development may be that those children passively acquired immunity maternally; although this should be subject to further research.

In conclusion, this study has added to the growing array of evidence on the coexistence of sickle cell anemia and malaria. Continuous surveillance of malaria parasitemia among individuals with sickle cell anaemia should be prioritized in other regions of the country to determine the prevalence of this coexistence. The multiple evidences to be obtained from such studies may serve as a template by health policy makers and specialists for appropriate management of the disease.

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