Nigerian Journal of Paediatrics 1981; **8** (**4**): 87-89

Incidence of Sickle-cell Trait and Anaemia in Ibo Pre-school Children

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Summary

Kaine WN and Udeozo IOK. Incidence of Sickle-Cell Trait and Anaemia in Ibo Pre-School Children. *Nigerian Journal of Paediatrics* **1981; 8: 87.** One thousand and twenty-two Ibo children, aged between 4 months and 5 years, were screened for the presence of sickle haemoglobin HbS. Twenty-two and half per cent had sickle cell trait HbAS, while 1.6% had sickle-cell anaemia. The overall incidence of Hb S (24.1%) was similar to reports from other parts of Nigeria. There was no sex difference in the incidence of sickle-cell trait and anaemia. The rarity of Hb C in the Ibos is confirmed in the present study.

Introduction

ALTHOUGH the first case of sickle-cell anaemia in the literature was reported in 1910 by Herrick,[1] it was not until 1917 that the genetic nature of the disease was recognised by Emmel.[2] In 1949, Beet[3] and Neel,[4] working independently, showed that the gene for sickle haemoglobin (HbS) was inherited as a mendelian recessive factor which in the heterozygous, gave rise to the trait while the homozygous developed the anaemia. In that same year, Pauling and his co-workers[5] introduced haemoglobin electrophoresis and demonstrated that sickle-cell anaemia was the result of a defect in the haemoglobin molecule. The development of the filter paper electrophoresis by Motulsky, Paul and Durrum[6] and later, the cellulose acetate electrophoresis by Owens *et al*,[7] made it possible to screen large population samples for abnormal haemoglobins.

In 1959, Lehmann and Nwokolo[8] reported the result of haemoglobin electrophoresis on 257 school-age Ibo children and adults. They found the incidence of sickle-cell trait to be 24.3%, but they did not report on the incidence of sickle-cell anaemia. The present study was therefore undertaken to provide information on the incidence not only of sickle-cell trait but also of sickle-cell anaemia in Ibo pre-school children.

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Patients and Methods

The University of Nigeria Teaching Hospital serves as a general hospital for the town of Enugu and its environs. The paediatric general outpatient takes care of pre-school children, while

children of school age (6 years and above) are cared for, at the school children's clinics. There are a few under-five clinics in the town but these are run by the State Ministry of Health.

Blood samples were collected from 842 children who attended the paediatric general out-patient as well as from 180 children attending the under-five clinics. Electrophoresis was performed on cellulose acetate with tris-EDTA-borate buffer at pH 8.9 according to the method described by Dacie and Lewis.[9]

Results and Comments

There were 1022 children (559 males and 463 females), aged between 4 months and five years. The results of electrophoresis are shown in Table I. HbS was found in 246 (24.1%) of the 1,022 children and of these, 230 (22.5%) had sickle-cell trait (Hb AS), while 16 (1.6%) had anaemia (Hb S). On the basis of the population of the Ibos being 8 million (1963 census) and 25% of the population being pre-school children, the present results indicate that over 30,000 Ibo pre-school children in Eastern Nigeria have sickle-cell anaemia. Table II shows the electrophoretic pattern in the sexes. There was no sex difference in the distribution of sickle-cell trait and anaemia.

TABLE I

Hb Electrophoresis Pattern in 1022 Pre-school Children

Genotype	*No. of Children*	*% of Total*
AA	775	75.8
AS	230	22.5
SS	16	1.6
AC	1	0.1
Total	1022	100.0

TABLE II

Sex Distribution of Hb Electrophoresis in 1022 Pre-school Children

Genotype	*Male*		*Female*	
	No. of cases	*% of Total*	*No. of cases*	*% of Total*
AA	425	76.0	350	75.6
AS	125	22.4	105	22.7
SS	8	1.4	8	1.7
AC	1	0.2	–	–
Total	559	100.0	463	100.0

The distribution of HbS in different parts of Nigeria is shown in Table III. The study by Jellife and Humphreys[10] showed the incidence of HbS to be 23.7% in the West, while earlier reports from Northern Nigeria by Jellife,[11] and by Walters and Lehmann[12] showed that the incidence of HbS was lower in that region than in the rest of the country. This was attributed by Jellife,[11] to the mixed racial origin of some of the inhabitants of the North. However, later studies in the same North by Roberts, Lehmann and Boyo,[13] and by Fleming *et al*[14] have shown that the incidence of HbS is as high as in the South.

TABLE III

Incidence of HbS in Different Parts of Nigeria

Part of Nigeria	*No. of Subjects*	*HbS+ve*	*% + Total*
1. West	1881	446	23.7
2. North	659	98	14.9
3. Middle Belt (Igalla)	155	28	18.0
4. East (Ibos)	257	64	24.9
5. Garki (Northern Nigeria)	2742	793	28.9

1. Jellife and Humphreys[10]
2. Jellife[11]
3. Walters and Lehmann[12]
4. Lehmann and Nwokolo[8]
5. Fleming *et al*[14]

Haemoglobin C was found in only one of the 1,022 children in the present series. The rarity of this abnormal haemoglobin in Eastern Nigeria has been reported previously by Lehmann and Nwokolo.[8] In Nigeria, haemoglobin C is found mainly in the West.[12] The muslim civilisation which spread to the West from the North resulted in intermarriage between the people of these two regions while the East remained isolated from the rest of the country until the advent of Western civilisation. This pattern of past population movements in Nigeria is probably responsible for the rarity of Hb C in Eastern Nigeria.

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Accepted 14 October 1980