

## Severe Anaemia in the First Two Years of Life\*

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**Seriki, O. (1974).** *Nigerian Journal of Paediatrics*, 1 (1), 33. **Severe Anaemia in the First Two Years of Life.** A retrospective study of severe anaemia in 117 children, aged 1 day to 2 years, admitted to the University College Hospital Ibadan, over a six-month period is reported. The object was to determine the prevalence, clinical features and causes of severe anaemia in this age group, and to assess the results of our current management. The study has revealed that severe anaemia is a common paediatric emergency. *P. falciparum* and bacterial infections in sicklers were the leading causative factors. Others included bleeding from circumcision wound and umbilical cord, prematurity and malnutrition. The mortality in this small series was 6 per cent. Urgent blood transfusion is the most important life-saving measure coupled with the treatment of infections, and the use of diuretics as an essential supportive measure.

It is suggested that a significant reduction in the incidence of severe anaemia in early childhood can be achieved through effective control of malaria

SEVERE anaemia is a major paediatric problem in countries where malaria infection is endemic or hyperendemic. Hendrickse and King (1958) in a study of 24 anaemic children under 2 years of age, reported that malaria infection was the most important single cause of anaemia in Nigeria

The object of the present study is

- (a) to re-examine the causes of severe anaemia in young infants and to see if the situation has changed since the study by Hendrickse and King;
- (b) to assess the results of our current therapeutic management. Severe anaemia in this study is defined as haematocrit value of 20 per cent or less.

Haematocrit value of 20 to 30 per cent in neonates and very young infants is also regarded as severe anaemia.

### Materials and Method

The medical records of all admissions to the Children's Emergency Room (Ch.E.R.), University College Hospital, Ibadan, over a period of six months (January 1 to June 30, 1970) were reviewed. Investigations carried out in cases of severe anaemia included haematocrit estimation, white cell count, blood smear for malaria parasites, haemoglobin electrophoresis (genotype), blood culture, bacteriological examination of stools and swabs from septic umbilical cord or

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\* Based on the paper read at the Conference of the Paediatric Association of Nigeria held in Zaria, January 11-13, 1973.

skin lesions. Others were Glucose-6-phosphate dehydrogenase (G-6-P.D.) activity, serum urea and electrolytes, chest x-ray and lumbar puncture when the latter was indicated.

### Results

The total number of admissions into the Ch.E.R. during the period under review was 1,964. Of these, there were 117 children (5.9 per cent), aged 1 day to 2 years with severe anaemia. There was no significant sex difference, nor was there any difference between the total number of cases in the age group 1 day to 11 months, and in the age group 11 to 24 months (Table I). The number of cases admitted per month (Table II), shows no difference between the total number of cases in the first three months of the year and the second three months which coincide with the beginning of the rainy season.

TABLE I

*Age and Sex of 117 Cases of Severe Anaemia*

Age (Months)	Sex	
	M	F
0-5	17	12
6-11	14	18
12-17	11	15
18-24	15	15
Total	57	60

TABLE II

*Number of Anaemia Cases per Month*

Month	No. of cases	Percentage
January	17	14.5
February	26	22.2
March	19	16.2
April	12	10.3
May	21	18.0
June	22	18.8
Total	117	100.0

The presenting complaints are summarized in Table III. It will be observed that fever, cough, vomiting, diarrhoea, anorexia and convulsion were the most frequent complaints. Fever (temperature 99.4—105.4°F.) occurred in all the 83 patients with infections. Cough was also a common complaint in patients with associated respiratory infection. Eleven of the children who presented with diarrhoea and or vomiting required intravenous fluid therapy. The miscellaneous complaints included weakness in eight children and excessive crying in five.

TABLE III

*Presenting Symptoms in 117 Cases of Severe Anaemia*

Symptom	No. of cases
Fever	83
Cough	29
Dyspnoea	9
Vomiting	32
Diarrhoea	22
Anorexia	16
Bleeding from umbilical cord or circumcision	8
Restlessness	7
Convulsion	11
Miscellaneous	13

The most frequent sign, as would be expected, was marked pallor of the mucous membranes, being observed in 106 cases. Other signs (Table IV), included tachycardia, poor pulse volume, triple or gallop rhythm, soft systolic murmur and pedal oedema. Hepatosplenomegaly was commonly observed in those with malaria infection. Pedal oedema and enlarged, tender liver occurred in patients with heart failure. Acidosis was observed in 9 patients. The miscellaneous findings included crepitations in the lung fields (5); jaundice (3); dactylitis in patients with Hb genotype S (3); irritability (3); significant lymphadenopathy (2); and cardiomegaly (2).

TABLE IV

*Physical Signs in 117 Cases of Severe Anaemia*

<i>Sign</i>	<i>No. of cases</i>
Pallor (marked, paper white)	106
Hepatomegaly	56
Splenomegaly	49
Tachycardia	70
Dehydration	11
Acidotic breathing	9
Malnutrition	9
Pedal oedema	8
Gasping or moribund	5
Miscellaneous	18

Table V summarizes the causes of the anaemia. Malaria, either alone or in association with bacterial infections, occurred in 45 (38.5 per cent) of the cases. *P. falciparum* malaria was the commonest parasite, although few children had mixed infections. The next common cause was bacterial infection occurring in either normal children or those with Hb S genotype. The bacterial organisms were coliforms, salmonella haemophilus influenzae, and staphylococcus pyogenes. Bleeding from either the umbilical

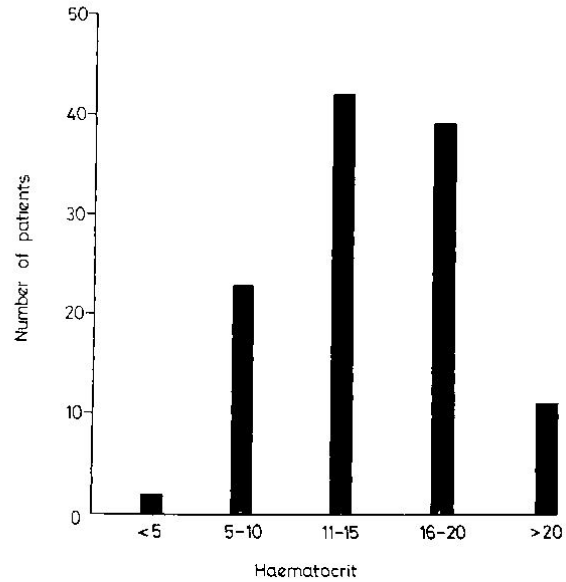
TABLE V

*Causative Factors in 117 Cases of Severe Anaemia*

<i>Cause</i>	<i>No. of cases</i>	<i>Per cent of total</i>
Malaria infection	43	36.8
Malaria and bacterial infections	2	1.7
Bacterial infection with Hb S.	20	17.0
Bacterial infections alone	12	10.3
Bleeding (cord or circumcision)	6	5.1
Bleeding associated with bacterial infection	2	1.7
Prematurity	5	4.3
Malnutrition	2	1.7
Undetermined	25	21.4
Total	117	100.0

cord or circumcision wound occurred in six infants (4 neonates). Other less common causes were prematurity and malnutrition. Although some children were underweight, only two children showed definite evidence of protein malnutrition. No causative factor was identified in 25 cases (21.4 per cent). G-6-P.D. activity was estimated in a very small number of the patients and therefore, no valid conclusion could be drawn from the available data.

The haematocrit values are illustrated in Fig. The value was 15 per cent or below in 57 per cent of the cases. Eleven infants including five neonates, had values between 21 and 27 per cent.



### Management

Transfusion with uncrossmatched but grouped blood was given to 11 desperately ill patients. Others received either fully crossmatched and packed red cells or whole blood. Blood was transfused at the rate of 10-15 drops/minute. The mean haematocrit value in infants who received uncrossmatched blood was 8.1 per cent (range 4-13). The mean haematocrit value for

patients who received either packed cells or whole blood transfusion was 13.9 and 16.1 respectively. In many of these patients, more than one blood transfusion was necessary to correct the anaemia. The transfusion was discontinued in three patients because of untoward reactions which were associated with uncrossmatched blood in two patients and crossmatched blood in one. Chloroquine sulphate was administered to all the patients while antibiotics were given as indicated. Oral or parenteral digoxin and short-acting diuretics (furosemide or ethacrynic acid) were used to treat patients with frank or incipient heart failure. Routinely, all the patients on discharge from the Ch.E.R. were referred to the Children's Outpatient Clinic for follow-up. However, there were only 60 patients who kept the appointment and were followed up for periods varying from 1 week to 4 months. The fate of the defaulters was unknown.

### Mortality

Seven patients (6 per cent) died; of these, death occurred in three before blood transfusion could be arranged. Of the remaining four patients one had severe malaria infection and repeated convulsions; one other had dehydration and metabolic acidosis; another had bronchopneumonia and anuria, while the last one had severe measles and bronchopneumonia. All the deaths occurred within 12-24 hours after admission and were attributed to the multiple factors involved.

### Comments

In 1958, Hendrickse and King in their study of anaemia in Ibadan children showed that malaria infection was the most important single cause of anaemia in infancy. Jilly and Nkrumah (1965) also found in a survey of anaemia in Ghanaian children that malaria was the most important aetiological factor. The present retrospective study of 117 children under the age of

2 years with severe anaemia has revealed that in 43 (36.8 per cent), malaria infection still remains the leading cause of the anaemia in early childhood. This finding indicates among other things, the failure of the existing eradicating and control measures against malaria infection. In Ibadan, and indeed throughout Nigeria, widespread publicity (through the radio, television, newspapers and posters) is given on the use of antimalarial prophylaxis. It would have therefore, been expected that if a majority of young children were given antimalarial prophylaxis, the incidence of malaria anaemia would have been significantly reduced. That such a reduction has not been achieved as shown by the present study, would suggest either poverty or ignorance or a combination of both factors in the public.

The important causative role of bacterial infections and Hb genotype is illustrated by the fact that 32 cases (27.3 per cent) were due to either infection in non-sicklers (10.3 per cent) or in sicklers (17.0 per cent). This finding, in relation to sicklers, confirms the well recognised susceptibility of these patients to infection. Often, it is the infection which precipitates the sickle cell crisis and rapid drop in the haematocrit.

There can be no doubt that the most effective management of severe anaemia is urgent blood transfusion coupled with appropriate treatment of co-existing infection(s) and associated conditions (metabolic acidosis, dehydration, etc.) and the use of a short-acting diuretic. Harrison (1968) has shown the effectiveness of the short-acting diuretics in the management of severe anaemia in pregnancy. Although digitalis was used in the management of some of the present cases, its usefulness has not, to our knowledge, been evaluated. Therefore, the value of this drug in the management of severe anaemia requires further study.

The known mortality in this small series was 6.0 per cent. It must be admitted that the mortality was probably higher than this since only 60 (51.3 per cent) of the children returned for follow-up after 24-48 hours of being discharged from the Emergency Room. Of the seven deaths,

three occurred shortly after admission, before blood could be obtained for transfusion; death in the others was attributed to the multiple factors involved. There is no doubt that some of the deaths were avoidable had medical attention been sought early. This implies lack of awareness of the serious nature of the illness by parents.

### **Acknowledgement**

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