

Developmental Progress of Nigerian Infants of Low Birth Weight in the First Year of Life

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Thwaites, M. McGucken, R. B. and M. le Jossec (1974). *Nigerian Journal of Paediatrics*, 1 (1), 10. **Developmental Progress of Nigerian Infants of Low Birth Weight in the First Year of Life.** Developmental progress and fate of 50 Nigerian infants with low birth weight is reported. Of the 50 infants in the study, 13 were lost to follow-up by the end of the 12-month period. The morbidity and mortality among these infants were 57 per cent and 18 per cent respectively. Of the possible factors which may adversely affect satisfactory growth of these 'at risk' infants, the presence of more than one young sibling in the family seems to be the most important.

INFANTS of low birth weight constitute about 42 per cent of the total number of admissions to the neonatal unit at the Wesley Guild Hospital, Ilesha, in the Western State of Nigeria. The prognosis of such infants in Nigeria and other developing countries in the tropics is poorly documented; there is also little information concerning their developmental progress after discharge from hospital. Such information is difficult to obtain because follow-up is often inadequate due to long distances involved, mothers' unwillingness to return to hospital, and lack of suitable home visiting services.

Since 1963, a team of nurses from the Save the Children Fund (S.C.F.), working in Ilesha, have carried out home-visiting and village-based follow-up services for a number of children discharged from the Wesley Guild Hospital. The purpose of this communication is (a) to report the developmental progress of a group of low birth weight infants who were followed up for a period of a year, and (b) to show that even with

a small team of workers a satisfactory follow-up service is possible.

Patients and Methods

During a six-month period (May to October 1971), 50 infants (25 male and 25 female) of birth-weight 2.0 kg. or less were discharged from the neonatal unit, Wesley Guild Hospital, to homes within the area covered by the S.C.F. team.

The district covered comprises Ilesha town and villages within a 30-mile radius. After leaving hospital, the babies were seen at home or in the village clinics at two-week intervals by the S.C.F. nurses, and less frequently at the hospital.

Of the 50 infants in the study, twenty-seven were delivered at home, 18 in the Wesley Guild Hospital, and the remaining 5 in local maternity homes. The birth-weights ranged between 1.6 kg. and 2.0 kg. in 38 babies, and less than 1.6 kg. in 12. Of the 43 infants whose gestational age

was estimated, according to the criteria of Robinson (1966), 33 were 36 weeks or more and 10 were 34-35 weeks of gestation. Although weights were recorded at each visit, only those at 6 months and 12 months of age were used for the final assessment. Developmental assessment at approximately one year of age included motor skills, vision, hearing and language, and social responsiveness, according to the methods recommended by Sheridan (1960).

Results

Neonatal Course

Twenty-five (50 per cent) of the infants had an uneventful neonatal course in hospital, and their average duration of stay was 14 days. Table I summarizes the causes of morbidity in the remaining infants. Six of the jaundiced babies received exchange blood transfusion and two anaemic infants were given simple blood transfusion. The baby with birth asphyxia (Apgar score 3) was intubated and given intermittent positive pressure ventilation for 30 minutes. The only infant with tetanus was born at home and

he presented at the age of 10 days. He made an uneventful recovery. On discharge, the condition of all these infants was satisfactory.

Progress during the first year

A complete follow-up for a year was undertaken in 37 (74 per cent) of the 50 infants. Of the remaining 13 infants, eight were known to have returned to their homes in different parts of the country outside the area covered by the S.C.F. team. The ultimate fate of these eight infants is unknown. The mother of one child refused to attend the hospital; one other child, aged 8 months developed meningitis with severe brain damage and was discharged to die at home; the other 3 children could not be traced.

Table II lists the major causes of morbidity during the 12-month period of follow-up. Twenty of the children were hospitalized at different times on 24 separate occasions, while the others were treated as out-patients. Bronchopneumonia was the leading cause of morbidity, followed by

TABLE I

Causes of Neonatal Morbidity in 25 Infants of Low Birth Weight

Condition	No. of Cases
Jaundice (total serum bilirubin > 12 mg./100 ml.)	9
Severe diarrhoea	4
Umbilical sepsis	1
Tetanus	1
Anaemia	2
Birth asphyxia	1
Recurrent apnoeic attacks and urinary tract infection	1
Feeding problem	1
Miscellaneous minor infections	4
? Congenital heart disease	1
Total	25

TABLE II

Major Causes of Morbidity in the First Year of Life of Infants with Low Birth Weight

Disease	No. of Cases
Measles	5
Whooping cough	3
Bronchopneumonia	17
Gastroenteritis	8
Meningitis	1
Sickle cell disease	1
Marasmus	1

gastroenteritis and measles. Measles occurred at the age of 6 months in two infants and at 7 months in another three. None of these infants were immunized against measles. There was a pair of twins, aged three months, who developed whooping cough after one dose of triple vaccine; one of these died.

There were altogether nine deaths in the entire series. The causes of death and the age at which death occurred are summarized in Table III. It will be seen that death occurred before the age of six months in the majority of the children.

TABLE III

Age, Birth Weight and Causes of Death in 9 Children During the First Year of Follow-up

	Age	Birth weight (kg.)	Cause of death
Wk.	5	1.6	Bronchopneumonia
	6	1.7	Marasmus
	6	1.9	Marasmus
Mon.	2	1.6	? Cot death
	2	1.7	Bronchopneumonia
	2	1.4	Gastroenteritis
	3	1.4	Pertussis
	6	1.7	Unknown
	8	1.3	Unknown

Evaluation of weights, motor and mental development

The weights in percentiles (Table IV) of 35 and 29 infants aged six and 12 months respectively were available for analysis. Comparing these weights with the normal weight curves of the local children (Morley *et al.* 1968), there were 19 infants (54.3 per cent) who were below the 10th percentile curve at the age of six months. At the age of 12 months the number of infants below the 10th percentile was 12 (41.4 per cent). Thus, only 17.3 per cent of the infants initially

TABLE IV

Percentile Weights at 6 and 12 Months of age

Percentile	Age in Month	
	6	12
No. below 10	19 (54.3)	12 (41.4)
No. above 10	16 (45.7)	17 (58.6)
Total	35 (100.0)	29 (100.0)

Figure in parenthesis is per cent of total.

below the 10th percentile gained sufficient weight to reach the 10th percentile in the second six months of the first year. Possible adverse factors (Table V) which influence the growth in the entire group of infants include place of delivery, marital status of the father and, family structure. Statistically, the factor which seems to exert the greatest influence was the presence of more than one sibling in the family.

Motor and mental assessment was undertaken in only 25 children at the end of the study period. Development was judged to be within normal limits in 19 infants. Of the remaining six children, one had characteristic "salaam" spasms from the age of 10½ months. She was unable to stand without support, had poor manipulation and probable defective vision. Her vocalisation was also poor. Others exhibited varying degrees of motor and mental retardation.

TABLE V

Factors Possibly Influencing Weight at one Year

	No. of Cases	No. with weight below 10th percentile	No. with weight above 10th percentile
† Place of delivery	13	8	5
Home			
Hospital	16	4	12
† Family	12	7	5
Polygamous			
Monogamous	17	5	12
* Siblings		10	4
More than one	14		
One or none	15	2	13

* Difference statistically significant ($P < .05$, $> .01$).

† Not statistically significant ($P > .10$).

Discussion

In the present study, one of the problems of satisfactory follow-up after discharge of the low birth infants from hospital is long distance from the area of operation to the child's home.

Of the 50 infants at the beginning of the study, 13 were lost to follow-up by the end of the year. Eight of these infants were known to have returned to their home towns which were at some

distance from the area covered by the S.C.F. team. However, the team, consisting of a health visitor and three midwives, was able to carry out a routine programme of immunization, nutrition and health education in the villages in addition to the special supervision of the children in this study. Thus, satisfactory supervision of the progress of a group of "high risk" children is possible with a small team of trained personnel.

The need for close supervision of this group of "high risk" infants is emphasized by the results of the present study. The morbidity among these babies in the first year of life is unacceptably high. Bronchopneumonia, usually occurring within the first few months, was particularly common. Many of the possible factors involved in the morbidity of these children are preventable; such factors include the wide-spread practice of force-feeding and exposure to fumes from open cooking fires. In this small series, the prevalence of gastro-enteritis was also high. Low birth weight babies often require supplementary feeds and are therefore exposed to a greater risk of gastrointestinal disorders than the fully breast-fed ones. There is therefore, a great need for continuing education on infant feeding practices.

The mortality of 18 percent after discharge from hospital is comparatively high. In Britain, Crosse (1971) has reported a mortality rate of 26.4 per 1,000 in the first year of life among infants of birth weight less than 2.5 kg. The number of deaths in the present study also compares unfavourably with the overall infant mortality rate of 48 per 1,000 reported in Imesi, Western State, Nigeria, in 1966 (Morley D., personal communication). Seven of the nine deaths occurred within the first three months of life and were caused by preventable diseases. Possible factors associated with unsatisfactory growth include delivery at home, polygamous family structure, and the presence of more than one other child in the family. The presence of more than one young sibling in the family in 84 per cent of the infants weighing less than the 10th percentile at one year suggests the need for proper child spacing. On

the other hand, birth weight, period of gestation, sex and parental occupation did not appear to influence growth.

Drillien (1965) has shown that the prognosis for the low birth weight infant, in terms of mental and motor development, is less favourable than for the full term infant of normal weight. In the present series the only child whose development was severely retarded at one year had typical "salaam" spasms from the age of 10½ months. She had severe neonatal jaundice requiring one exchange blood transfusion. To our knowledge this type of cerebral damage has not been associated with neonatal hyperbilirubinemia. Five other children had some delay in development, which was not considered to be of serious consequence.

In conclusion it is suggested that a Nigerian baby whose birth weight is 2.0 kg. or less should be regarded as a "high risk" case which require very close home supervision for the first three months, and continued surveillance throughout the first year of life.

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REFERENCES

- Crosse, V. M. (1971). *The Preterm Baby* - 7th edition, p. 255. Edinburgh and London; Churchill Livingstone
- Drillien, C. M. (1965). Possible causes of handicap in babies of low birth weight. *J. Obstet. Gynaec Brit. Comm.* **72**, 993-997.
- Morley D., Woodland, M., Martin, W. J. and Allen, P. (1968). Heights and weights of West African village children from birth to the age of five. *W.A.M.J.* **17**, 8-13.
- Sheridan, Mary D. (1960). *The developmental progress of infants and young children*. Ministry of Health publication No. 102, H.M.S.O., London
- Robinson, R. J. (1966). Assessment of gestational age by neurological examination. *Arch. Dis. Childh.*, **41**, 437-447