

Neonatal Jaundice in Northern Nigeria

*J.B.S. COULTER, M.A. AKPABIO, S.O.N. JIKEME

AND

THEODORE KAY

*Department of Paediatrics, Ahmadu Bello University Hospital, Kaduna,
Departments of Haematology and Chemical Pathology, Ahmadu Bello University Hospitals, Zaria and Kaduna*

Summary

Coutter, J. B. S., Akpabio, M. A., Jikeme, S. O. N. and Kay, T. (1977). *Nigerian Journal of Paediatrics*, 5(1), 12. **Neonatal Jaundice in Northern Nigeria.** Investigations of the aetiology of neonatal jaundice in infants attending Ahmadu Bello University Hospital, Kaduna, support other studies in Nigeria in respect of a higher male preponderance over female, the direct association of infection, G-6-PD deficiency and ABO incompatibility with this common neonatal problem. The frequency of the disease in the present small series was lower than that reported from Ibadan and Lagos. The finding of a lower incidence among the Hausa ethnic group than among the Yoruba and the Ibo groups suggests the possibility of a tribal factor in its aetiology. Further investigations of this tribal differences may help to clarify the aetiology of the condition.

NEONATAL jaundice has been shown to be a common problem in Southern Nigeria. Ransome-Kuti (1972) found neonatal jaundice to be the commonest neonatal emergency and the sixth most common cause of paediatric emergency admission to the Lagos University Teaching Hospital. Neonatal jaundice has also been identified as an important cause of brain damage and neonatal mortality in Southern Nigeria (Animashaun, 1971). In a recent study of 195 cases of neonatal jaundice seen in the Children's Emergency Room, University College Hospital, Ibadan, glucose-6-phosphate dehydrogenase (G-6-PD) deficiency, ABO

incompatibility, low birthweight and infection were found to be the main aetiological factors (Effiong and Laditan, 1976).

The present communication reports the prevalence of and the aetiological factors among infants with neonatal jaundice seen in an institution in Northern Nigeria.

Materials and Methods

During the period 1st January to 31st December 1975, all neonatal admissions into the Emergency Paediatric Unit of the Ahmadu

*Correspondence to J.B.S. Coulter, Department of Child Health, Foresterhill, Aberdeen, AB9 2ZD Scotland

Bello University Hospital, Kaduna were examined for the presence of neonatal jaundice. The tribal origin of each neonate was also documented.

Thirty-four jaundiced infants, all of whom had unconjugated serum bilirubin levels above 12 mg per 100 ml who presented during the period April to December 1975 constituted the study group. Clinical data recorded in each of these patients included sex, maturity, evidence of infection, and any other features that may be associated with jaundice such as haematoma, and splenomegaly. Maturity was assessed by the Dubowitz scoring method (Dubowitz, Dubowitz and Goldberg, 1970) which has been found applicable to Nigerian neonates (Brueton, Palit, and Prosser, 1973; Dawodu and Effiong, 1977).

Investigations carried out on the infants included a full blood count, blood culture, blood group of mother and baby, direct Coombs' test, and G-6-PD estimation using the qualitative screening method as described by Motulsky, *et al.*, (1959); in a few cases G-6-PD was also estimated quantitatively using the method of Glock and McLean (1953), the normal value by this method taken as a level greater than 1200 international units.

During the same period, a control group consisting of 43 infants was also studied. Twenty-seven of these were infants delivered by Caesarian section, chosen because their mothers would normally be kept in hospital for up to ten days. The remaining 16 were infants randomly selected from the delivery room. The investigations undertaken on the control group were, except blood cultures, similar to those on the jaundice group. On the fourth day of life all the babies were examined clinically and those delivered by Caesarian section had all the investigations listed above for the jaundice group performed. In the randomly selected infants, the same list of investigations, except serum bilirubin, were performed on cord samples, taken at birth and serum bilirubin was determined separately on the fourth day

of life. Two of the randomly selected babies became jaundiced on the fourth day of life with serum bilirubin of 17.5 mg and 15 mg per 100 ml respectively and were therefore transferred into the jaundice group. Thus there were 36 infants in the study group and 41 in the control.

Significant levels were determined by Chi-Squared (X^2) or, when numbers were small by the Fisher's Exact Test.

Results

There were 400 neonates admitted into the Emergency Paediatric Unit during the period 1st January to 31st December 1975, and of these 67 (16.8 per cent) were jaundiced. Thirty of the jaundiced infants were born at home while 37 were born in the Ahmadu Bello University hospital, Kaduna, but were, in most cases discharged home early. In the study period (April to December 1975) there were 36 jaundiced infants, including the 2 cases transferred from the control group.

Tribal Incidence

The ethnic distribution of all the admissions including that of the jaundiced babies is shown in Table I. The frequency of jaundice differed significantly between the ethnic groups ($P < 0.001$). The incidence of jaundice was lowest (6.2 per cent each) among the Hausa and the Gwari, and highest among the Katab (33.3 per cent) and the Yoruba (32.9 per cent). The incidence of jaundice between the Hausa (6.2 per cent) and the two other ethnic groups with the highest number of admissions, the Yoruba (32.9 per cent, $P < 0.005$) and the Ibo (27.6 per cent, $P < 0.006$) differed significantly. There was however, no clear evidence of direct relationship between the frequency of jaundice and the number of admissions.

TABLE I

Distribution of Neonatal Jaundice among Different Ethnic Groups in Kaduna, Northern Nigeria

<i>Ethnic origin of patients</i>	<i>No. of Admissions</i>	<i>No. of babies with Jaundice</i>
Hausa	113	7 (6.2)
Yoruba	76	25 (32.9)
Ibo	29	8 (27.6)
Idoma	19	0
Gwari	16	1 (6.2)
Tiv	15	3 (20.0)
Jaba	14	3 (21.4)
Katab	12	4 (33.3)
Other tribes	106	16 (15.1)
Total	400	67 (16.8)

Percentages are represented in bracket

Aetiological factors

The prevalence of various potential causes of jaundice in the study and control groups are listed in Table II. In the jaundice group the male/female ratio was 3:1, while in the control the ratio was 1:1. There was therefore a statistically significant sex difference ($P < 0.05$) between the study and control groups. Although the number of preterm babies in both groups was small, prematurity did not appear to be a significant factor since in only two of the six preterm infants with jaundice was no cause

found for the hyperbilirubinaemia other than prematurity. A diagnosis of infection based on clinical features alone or a positive blood culture was made in 19 (52.7 per cent) of the jaundice group, and in five (12.2 per cent) only of the controls. Blood group was determined in 26 (63.4 per cent) of the 41 babies in the control group, and two (7.7 per cent) of these had the set-up for ABO incompatibility. In the jaundice group, the blood group was determined in 36, and out of these 13 (36.0 per cent) had the set-up for ABO incompatibility. The difference in the set-up for ABO incompatibility between the two groups was thus significant ($P < 0.01$).

The qualitative screening test for G-6-PD deficiency was not as accurate as the quantitative method since some of the infants who had negative results by the former method were found to be positive by the latter. However, using the screening test the enzyme was found to be deficient in 2 (5.2 per cent) out of 38 babies in the control, and 5 (23 per cent) out of 21 babies in the study group. By the quantitative method one out of 6 infants (16.7 per cent) in the control group was deficient in the enzyme, while 8 out of 11 (72.7 per cent) in the study group were deficient. In 11 out of 19 (57.9 per cent) jaundiced infants with clinical features of infection and/or a positive blood culture, there was also G-6-PD deficiency and/or the set-up for ABO incompatibility.

TABLE II

Possible Aetiological Factors in 41 Control and 36 Jaundiced Infants

<i>Group</i>	<i>No. of cases</i>	<i>Preterm Infants</i>	<i>Clinical diagnosis</i>	<i>Positive blood culture</i>	<i>Set-up for ABO incompatibility</i>	<i>G-6-PD deficiency by the screening method</i>	<i>G-6-PD deficiency by the quantitative method</i>
Control	41	3	5	-	2(26)	2(38)	1(6)
Jaundice	36	6	15	9(30)	13(36)	3(21)	8(11)
P	-	0.2	<0.05	-	<0.01	0.1	0.16

Number of subjects are represented in brackets.

Other Relevant Features among the jaundice group

The total serum bilirubin level ranged between 12.8 – 33.6 mg per 100 ml (mean 22.3 mg. per 100 ml). There were 7 cases of kernicterus, Anaemia, defined as a haemoglobin below 12 gm per cent, occurred in 8 (22.2 per cent) of the 36 babies. The direct Coombs' test was negative in all the cases, and there were neither cases of Rhesus incompatibility nor splenomegaly in the study or the control group. Haematomata did not appear to be an important factor, being present in 3 jaundiced and 2 control infants.

Discussion

In the present study, the Hausa ethnic group with the largest number of admissions had the lowest incidence (6.2 per cent) of neonatal jaundice. This was particularly evident compared to the Yorubas and the Ibos who had the next largest number of admissions but with incidence of jaundice of 32.9 per cent and 27.6 per cent respectively. These differences in the incidence of neonatal jaundice between the different tribes may be due to various factors including the level of education, attitude to diseases, ease of access to hospital, distribution of blood groups and red cell enzymes, or specific customs that might predispose an infant to jaundice. Our findings are however inadequate for drawing definite conclusions on these various factors, but the absence of any association between the incidence of jaundice and the total number of admission for the various ethnic groups suggests that ease of access to hospital did not have a significant effect on the observed frequency of jaundice. Further studies of blood groups, red cell enzymes, and social factors in areas of mixed tribal distribution may help to clarify the various aetiological factors in neonatal jaundice.

The male preponderance and the high incidence of infection among the study group agrees with the finding of Effiong and Laditan (1976). Unfortunately, the blood groups of mothers and their babies were known in only 63 per cent of the controls. Despite this, there was a significant difference in the set-up for ABO incompatibility between the two groups ($P < 0.01$). The results of the G-6-PD estimations were not significant although there was a trend toward a higher incidence of deficiency in the jaundice group, particularly among those tested by the quantitative method with 73 per cent of the infants being deficient.

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