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Prevalence of Neonatal Jaundice on Central Hospital, Warri, Delta State, Nigeria

Abstract

Purpose: To determine the prevalence and predisposing factors of Neonatal Jaundice in a health-care facility in Delta State.

Methods: 272 babies (aged 1 – 30 days) the Neonatal Clinic of the Department of Child Health, Central Hospital, Warri, Delta State between June 2009 and June 2010 were examined daily for evidence of jaundice. Those with serum bilirubin $\geq 15\text{mg}/100\text{ml}$ were subjected to additional clinical and laboratory investigations to determine the predisposing/etiologic factors for jaundice. The socio-demographic data of their mothers were assessed using a semi-structured questionnaire. The data generated were analyzed.

Results: Of the 160 male and 112 female babies sampled, 56 males (21%) and 33 females (12%) were found to be jaundiced. Majority of the cases (72.4% males, 70.8% females) had known predisposing/etiologic factors. The mothers who were single and divorced had relatively higher cases of jaundiced babies (50% and 35.5%, respectively). The prevalence rate was also higher among mothers with primary (55.1%) and secondary levels (36.8%) of education, than those with tertiary level of education (8.1%). Glucose-6-phosphate dehydrogenase deficiency, ABO incompatibility and low birth weight were found to be major predisposing/etiologic factors.

Conclusion: Neonatal jaundice was common among the babies in the health facility studied and was higher among mothers who had low level of education and babies whose parents had divorced.

Keywords: Prevalence, Neonatal, Jaundice Screening.

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Introduction

Jaundice is a pediatric condition associated with yellow coloration of the skin and sclera in the new born due to the accumulation of unconjugated bilirubin [1]. In these infants, unconjugated hyperbilirubinemia (also referred to

as abnormally high serum bilirubin) may reflect a normal transitional phenomenon. The mechanisms responsible for jaundice include excessive production, decreased hepatic uptake or impaired conjugation of bilirubin, intra-hepatic cholestasis, hepatocellular injury and extra hepatic obstruction [2, 3].

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In West Africa, neonatal jaundice is also a common pediatric problem associated with high morbidity and mortality [4]. This condition has also been reported to be the commonest cause of neonatal admission to the Children's Emergency Room in Lagos University Teaching Hospital [5]. Attention has been drawn to the importance of etiological role of neonatal jaundice in cerebral palsy among Nigerian children [5, 6].

This study was carried out to provide valuable information on neonatal jaundice to achieve prompt and quality therapeutic treatment and prevent future occurrence. This will further help to prevent death and life-long neurologic sequence in the new-born and infant respectively, as a result of the neurologic effect of neonatal jaundice.

Methods

This study was conducted in the Neonatal Clinic of the Department of Child Health, Central Hospital, Warri, Delta State. The health-care facility is a 350 bed Secondary Centre of referral which serves neighboring states such as Bayelsa and Edo States. It is a secondary health-care facility that receives large bulk of patients as Warri is a highly commercialized and industrialized city-with low and affordable cost of services. The area is known for co-habitation of multiple ethnic groups. The socio-economic classes range from peasant fisherman, street hawkers to top class civil servants and business executives.

A total of 272 babies (aged 1 – 30 days) born in or referred to the health-care facility were sampled prospectively from 1st June, 2009 to 30th June, 2010. The mothers were assessed using a semi-structured questionnaire which contained: the sex and age of the child, level of education and marital status of the mother. The babies were examined daily by a member of the pediatrics staff for evidence of jaundice. Those with serum bilirubin of 15mg per 100ml and above were subjected to additional clinical and laboratory investigations to determine the predisposing/etiologic factors for jaundice. These investigations included whether there was drug administration at the third trimester of gestation or after birth, birth weight, infection, glucose-6-

phosphate dehydrogenase activity and blood groups.

The data obtained were analyzed using the Epi-Info version 10 software and data were presented using descriptive statistics.

Results

A total of 89 babies (33%) comprising of 56 males (21%) and 33 females (12%) were jaundiced. Mothers who were single and divorced had the highest rate of jaundiced babies (50.0% and 35.3% respectively). The rate of neonatal jaundice was higher among those whose level of education was primary school (55.1%) and those who had secondary level of education (36.8%) as compared to those with university education (8.1%) (Table 1).

Table 1: Marital status and educational levels of mothers with jaundiced babies

Variable	Jaundiced babies (%)
Marital Status	
Married	40 (14.7)
Single	136 (50)
Divorced	96 (35.3)
Education level	
Primary	150 (55.1)
Secondary	100 (36.8)
Tertiary	22 (8.1)

The results of full laboratory and clinical investigations available in the 89 cases of jaundice in babies for predisposing/etiologic factors are shown in Table 2.

Discussion

Our results indicate a high rate of jaundice among babies attending the health facility studied. The rates bear relationship with the mother's education and marital status. It is not clear whether the techniques in the management of the newborn in the facility or their mothers during pregnancy and puerperium that may be contributing to the observed high rate. In a previous study, the prevalence of jaundice was shown to be significantly higher in the male than in the female infants which is consistent with our finding [7]. However, male-female ratios ranging from 2:1 to 3:1 in cases of severe neonatal

Table 2: Possible predisposing/etiologic factors in babies with jaundice

Predisposing Factors	No of Cases (%)	
	Male	Female
G-6-PD deficiency alone	25 (35.3)	9 (16.4)
G-6-PD deficiency + ABO incompatibility	8 (11.4)	3 (5.5)
G-6-PD deficiency + low birth weight	3 (4.3)	1 (1.8)
Total with G-6-PD deficiency	26 (51.0)	3 (23.7)
ABO incompatibility alone	6 (11.4)	12 (25.4)
ABO incompatibility + low birth weight	2 (2.9)	2 (3.6)
Low birth weight alone (2.500gm)	4 (5.7)	8 (14.5)
Rhesus iso-immunization	-	2 (3.6)
Infection	1 (0)	1.4 (0)
Total with known etiologic factors	25(72.4)	23 (70.8)
Unknown	15(29.2)	16 (27.6)
Total	56 (100)	33 (100)

jaundice referred from outside the teaching hospital has been reported in Lagos [5]. In a study of similar cases referred to University College Hospital (UCH), a male-female ratio of 1:6 was observed even though there was no significant overall sex difference among babies delivered in the health facility [4].

In our present study there was, however, a significant male preponderance over female among cases in whom deficiency of G-6-PD enzyme was the cause of the jaundice. The male preponderance is to be expected since the incidence of G-6-PD deficiency in the population is higher in the male (20%) than in the female (homozygous 3-4%) [8]. Furthermore, the enzyme deficient baby born outside the hospital is more likely to be exposed to a variety of known and unknown precipitating factors than one born in the hospital. Therefore, the observed male preponderance will be more noticeable in infants born outside the hospital. There was striking difference in the overall frequency of neonatal jaundice between those delivered in the Central Hospital, Warri and those who came from outside the Hospital which can be explained with the fact that in the latter hospital, babies are normally discharged within 48 hours after delivery unlike those from outside the hospital. It is also possible that the higher frequency is influenced by the type of patients admitted to this hospital. A majority of the cases admitted to the Central Hospital are those with anticipated complications of pregnancy or labor as many of the pregnant mothers seek alternative sources of

care, such as traditional birth attendants, for delivery services.

The overall prevalence rates of neonatal jaundice in different ethnic groups in Singapore (90%) and Europe (70%) have been reported [9]. Similarly, a high prevalence of jaundiced babies with a total serum bilirubin ≥ 15 mg per 100 ml has been reported among the Chinese in Hong Kong [7]. In Britain, it has been shown that the total serum bilirubin is above 10 mg per 100 ml in only 2% of newborn babies [10]. In this present study the overall prevalence is 32.6% while the prevalence among babies with a total serum bilirubin ≥ 15 mg per 100 ml is 5.8%. Thus, neonatal jaundice is more common among Nigeria babies than British ones and less common in the Chinese and Malaysians. These differences in the prevalence of neonatal jaundice may be related to genetic difference in bilirubin metabolism during the early neonatal period [9] and the high incidence of G-6-PD deficiency in areas where the condition mostly exists.

The relationship of G-6-PD deficiency in the etiology of neonatal jaundice in Nigerian children is demonstrated in this study. Early reports on the relationship between G-6-PD deficiency and neonatal jaundice in Nigeria concerned small number of subjects [11-13]. This association has been confirmed in Lagos [5]. Several other relationships have also been reported in other racial groups [14-19]. G-6-PD was deficient in 36 of 70 males (51%) and 13 of 55 females (23.7%). Eight of the 36 males and three of the 13 females, with this enzyme deficiency, also had

either A or B blood group while their mothers had O. Four babies, three male and one female of the enzyme deficient group, weighed less than 2.5 kg. There were 26 babies (19 male and 16 female) with either blood group A or B and whose mother's group was O. Low birth weight was associated with two males and females in this etiologic group. Low birth weight alone was found in four males and eight females and Rhesus iso-immunization was responsible for jaundice in two females. Jaundice occurred in 29.2% males and 27.6% females in whom no possible etiologic factor was found.

Conclusion

Neonatal jaundice was evident in the health-care facility and was common among babies whose mothers had low level of education and those whose parents had divorced. Glucose-6-phosphate dehydrogenase deficiency, ABO incompatibility and low birth weight were found to be major predisposing/etiologic factors.

Programmes that will enhance proper education on the prolonged impact of kernicterus if not properly treated should be promoted through campaigns, rallies, jingles, workshop and town criers. Poverty alleviation programmes should be made effective in order to empower parents whose wards are jaundiced. Malaria treatment should be encouraged in pregnancy to avoid hemolytic anemia which predisposes the foetus to jaundice. More antenatal centers especially those closer to the grass root communities should be made available so as to facilitate accessibility of pregnant mothers to orthodox methods of delivery. More personnel should be trained by government and non-governmental organizations in the treatment of jaundice.

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