

Low birth weight and its correlates among Nigerian twins

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Summary

The incidence and correlates of low birth weight (LBW) among an index population of 525 newborn Nigerian twins and a control population of 363 singletons were studied. The incidence of LBW among the twins (53.9%) was significantly higher than the incidence of 11.8% among the singletons ($P < 0.001$). Smallness for gestational age (SGA) was also higher (14.3%) among the twins compared with 1.4% among the singletons ($P < 0.001$). Morbidity factors frequently associated with LBW among the twins were perinatal asphyxia, hypothermia, neonatal seizures, and intracranial haemorrhage. Intrapartum asphyxia was particularly common in those preterm LBW twins who were also SGA. This raises serious concern because of the known higher risks of SGA preterm babies for severe neurologic sequelae. Low socioeconomic status (SES) of mothers was an important predisposing factor to LBW and SGA as well as to premature deliveries among the twins. Improved SES of the maternal population and increased awareness by health practitioners of the risks LBW twins face, should improve their immediate and later outcome. Furthermore, there is a need for the development of an intrauterine growth chart for Nigerian twins to enhance accurate diagnosis of LBW and SGA among newborn twins.

Résumé

L'incidence et les corrélatifs de poids peu élevé des bébés lors de la naissance parmi une population indexé de 525 jumeaux Nigériens et une population témoin de singletons ont été étudiés. L'incidence de poids peu élevé parmi les jumeaux (53,9%) était plus haute (53,9%) que l'incidence de 11,8% parmi les singletons ($P < 0,001$) les poids inférieurs par rapport à l'âge de gestation était plus fréquent (14,3%) chez les jumeaux en comparaison avec les singletons (1,4%) ($P < 0,001$). Les facteurs de morbidité associés fréquemment au poids peu élevé chez jumeaux sont: l'asphyxie périnatale, l'hypothermie, les attaques d'apoplexie et l'hémorragie intracraniale. L'asphyxie intrapartum était commun chez les jumeaux prématurés qui étaient à la fois trop petit à leur naissance et par rapport à leur âge de gestation. Ce groupe court le risque de sequele neurologique. Les statuts économique inférieur des mères et la naissance prématurée contribuent aux problèmes soulevés. Un meilleur statut économique, la prise de conscience des risques que courent de très petit jumeaux par les autorités concernées pourraient améliorer les conditions actuelles et virtuelles. En plus, il est nécessaire d'avoir un tableau de croissance intra-utérine pour les jumeaux Nigériens afin de prédire correctement les incidences de poids peu élevé à la naissance et par rapport à l'âge de gestation.

Introduction

The higher incidence of twinning among the Yorubas in Nigeria, namely 45-50/1000 [1] compared with 12/1000 among Caucasians [2] is well recognized. Whereas much attention has been paid to perinatal mortality among Nigerian twins, [3,4] there is a paucity of information about their perinatal morbidity. Low birth weight (LBW) is a well-recognized feature of twinning and other multiple births, [5]

but none of the several reports on birth weights of Nigerian newborns [6,7] has specifically addressed the birth weights of the twin population. As LBW in twins has different implications from singletons for growth and survival [8], the present study was undertaken to determine the consequences of LBW among Nigerian newborn twins.

Subjects and method

The study population comprised all the twins delivered at the University College Hospital (UCH), Ibadan, Nigeria, between January 1981 and December 1984. Each twin pair was seen after delivery by one of us (M.E.O.) and matched with the next singleton delivery of the same gestational age and sex. Each like-sex twin pair had one matched singleton while each unlike-sex twin pair of one male and one female matched singletons.

Gestational age of each neonate (twins and matched singletons) was based on the obstetric records and on the clinical assessment of the newborn infant using the Ballard's scoring system [9]. Naeve's chart [10] and Freeman's chart [11] were used to determine the intrauterine growth status of the twins and singletons, respectively. The 10th and 90th percentile were adopted as the limits of normal intrauterine growth.

Admission of any of the neonates into the Special Care Baby Unit (SCBU) for further care was based on the clinical judgement of the attending pediatrician, taking into consideration the maturity of the neonate and its overall morbidity status. Zygosity of the twins was not ascertained because this was not a routine practice in our hospital during the period of study. The socioeconomic status (SES) of each mother was assessed according to the socioeconomic index scores described by Oyedeji [12]. The data were analyzed using the chi-squared test or the student's *t* test where relevant.

Results

There were 11,352 deliveries at UCH during the study period. Of these, 302 were twin deliveries giving a twinning rate of 26.6/1000. Immediate post delivery assessment and selection of matching singletons was possible in 266 of the 302 twin deliveries. Two first twins who were delivered before arrival in UCH and 5 others, who were fresh stillbirths, were excluded from analysis, leaving 525 products of twin gestations available for analysis. Among the 266 twin pairs, 169 were like-sex and 97 unlike-sex; the control population was therefore 363 singletons.

Some relevant variables among the twin and singleton newborns and their mothers are listed in Table 1. Table 2 lists the associated aetiological factors in the 75 SGA twins and 5 SGA singletons. Pre-eclampsia and eclampsia constitute the commonest identified aetiological factor, but no definite aetiological factor was identified in 70.7% of the twins and 60.0% of the singletons. The diagnoses in the 3 mothers with chronic illness consisted of one case each of pulmonary tuberculosis, bronchial asthma, and sickle cell disease.

Table 3 relates the incidence of LBW and SGA to the SES of the mothers. LBW occurred more often in the lower SES class (Groups III and IV) than in the higher SES class (Groups I and II), but the difference was not statistically significant. It is, however, noteworthy that 83.75% of LBW twins and 77.3% of SGA twins were delivered to mothers of the lower SES class.

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Table 1: Comparison of some variables among twin and singleton newborns in Ibadan, Nigeria

Characteristic	Twins (Total = 525)	Singletons (Total = 363)	P value
Maternal age	29.4 ± 14.8	28 ± 5.7	NS
Maternal parity	2.8 ± 2.0	2.5 ± 2.0	0.05
Modes of delivery			
SVD	237(45.1)	267(73.5)	0.001
Breech deliveries	145(27.6)	16(4.4)	0.001
Caesarian section	129(24.6)	71(19.6)	0.05
Others	14(2.7)	9(2.5)	NS
LBW (<2500g)	283(53.9)	43(11.8)	0.001
V LBW (<1500g)	23(4.4)	2(0.55)	0.001
SGA	73(14.3)	5(1.4)	0.001
Apgar score 6 at 1 minute	183(34.9)	83(22.9)	0.001
Apgar score 6 at 5 minute	69(13.1)	26(7.2)	0.01
Neonatal seizures	16(3.0)	1(0.3)	0.001
Male/female ratio	1.3	1.2	NS

NS = Not significant at 5% level. Numbers in parenthesis are percentages.

Table 2: Associated aetiological factors in 75 SGA twins and 5 SGA singletons

Factors	Twins	Singletons
Pre-eclampsia and eclampsia	14	2
Chronic maternal illness	3	0
Maternal hypertension	2	0
Hydramnios	2	0
Uterine fibroids	1	0
Undetermined	53	3

Table 3: The effect of maternal SES among 525 twin neonates

Socioeconomic class	Mother No. (%)	Neonates No. (%)	LBW No. (%)	SGA No (%)
I & II	50(18.7)	98(18.7)	46(16.35)	17(22.7)
III - IV	216(81.2)	427(81.3)	237(83.75)	58(77.3)
Total	266(100)	525(100)	283(100)	75(100)

Table 4 compares the morbidity factors identified among the ill twins and singletons admitted to the SCBU. The most significant difference was in respect of LBW. Furthermore, LBW often coexisted with other morbidity factors among the twin neonates; for example, all the hypothermic twins and 14 of the 16 twins with neonatal seizures were preterm LBW babies. Four twin neonates had intracranial haemorrhage diagnosed at autopsy; prematurity, LBW, severe hypoxia were the associated aetiological factors in the 4 cases.

Fifty-six (19.8%) of the 283 LBW twins had low Apgar scores (6) at 5 minutes compared with 13(5.4%) of 242 normal sized twins ($P < 0.001$). Of the 75 preterm SGA twin neonates, 24 (32%) had low Apgar scores at 5 minutes, whereas only 15.4% (32 out of 208) preterm AGA twin neonates were similarly affected ($P < 0.05$).

Discussion

The twinning rate of 26.6/1000 found in this study is about half of the incidence of 45-50/1000 reported for the same area

of Nigeria about two decades ago [13], but similar to a more recent finding of 23.8/1000 [4]. A significant change in the dietary preferences and socioeconomic status of Nigerians has been postulated as the cause of this fall in the twinning rate [14].

Table 4: Comparison of morbidity factors among 159 twins and 54 singletons admitted into the SCBU

Morbidity factor	Twins total = 14	Singleton	P value
Low birth weight	150(94.3)	25(46.3)	0.001
Perinatal asphyxia (apgar score 6 at 5 minutes)	57(35.9)	26(48.2)	
Hypothermia (temp < 35°C)	42(26.4)	6(11.1)	< 0.05
Hypoglycaemia	32(20.1)	5(9.3)	NS
Neonatal jaundice (Bilirubin 10 mg/dl)	17(10.7)	4(7.4)	NS
Neonatal seizures	16(10.1)	1(1.9)	NS
Sepsis (septicaemia, pneumonia)	9(5.6)	4(7.4)	NS
Respiratory distress syndrome	9(5.6)	2(3.7)	NS
Anaemia	6(3.8)	2(3.7)	NS

() = % of total

The prominence of LBW as a major feature of twin births in the present study with prematurity as the main cause of the LBW, is similar to findings in an earlier study of twinning in Yoruba women [15]. The mean birth weight for twins 1 and 2 were 690 g and 675 g, respectively less than the mean birth weight for the singletons. This difference is comparable to the 700 g difference reported earlier between twin and singleton Nigerian neonates [15]. A quarter of LBW twins were, however, also growth retarded with an overall SGA incidence of 14.3%. This is significantly higher than the SGA incidence of 7.9% reported by Bienkiewica and Pogorzelska [16], who also used the 10th centile cut-off line on Naeye's chart [10]. The lower SGA incidence recorded by Bienkiewica and Pogorzelska probably reflects the better maternal nutritional status of their study population.

Jones and Battaglia [17] have suggested that maternal factors are prominent determinants of morbidity in twin gestations. The dominant role of low SES with inevitable maternal under-nutrition among our patients is also noteworthy because 84% of the LBW twins and 77% of the SGA twins were delivered to mothers of low SES. Maternal anaemia, which is common and also known to be associated with reduction in birth weights in our environment [18], could also be an important factor in the intrauterine growth retardation (IUGR) of the twins, but the incidence of anaemia was similar in our twin and singleton populations (Table 4). The identification of the pre-eclampsia and eclampsia as the commonest identifiable factor for IUGR among our twins is in agreement with the reported role of proteinuric pre-eclampsia in the pathogenesis of IUGR in twin gestation reported elsewhere [5]. Malarial infestation of the placenta may also play a significant aetiological role in IUGR among the twins because placenta malarial infestation is common in endemic areas and has been associated with reduction in the mean birth weight [9]. There was, however, no identifiable specific aetiological factors for IUGR in the majority of our twins and this is in accord with the previous observation that the majority of IUGR in twins are idiopathic [5].

The high incidence of LBW among our twins, no doubt contributed significantly to be concomitant perinatal asphyxia, hypothermia, neonatal seizures, and intracranial haemorrhage. The well-recognized increased risk of asphyxia in growth retarded neonates [20] is particularly evident among our SGA

twin population. More than a quarter (26.5%) of the preterm twins in the present study were SGA and this raises serious concern, because it is known that those preterm babies who are also SGA are, as a group, very prone to developing severe neurologic sequelae [21]. Furthermore, LBW which was evident in 4.4% of our twins births is known to predispose to periventricular and intraventricular haemorrhages [23,24] which are additional risk factors for later handicap among survivors.

Improved obstetric care and maternal nutrition would no doubt reduce the incidence of IUGR in twin gestations. Bed rest has been advocated for reducing the incidence of premature delivery in twin pregnancies [25], but in our environment, this ideal is often beset by formidable practical problems [3]. For example, the women at the greatest risks are the least likely to accept bed rest, because of socioeconomic handicaps. Additional impediments include limited hospital space and the high twinning rate, which make it impossible to accommodate for bed rest all Nigerian women with twin pregnancies. Poor transportation facilities may also prevent or delay hospital attendance of the pregnant mothers.

Twin pregnancies are, therefore, likely to remain high risk events in our environment for the foreseeable future. A considerable proportion of the twins will be delivered prematurely with IUGR and intrapartum asphyxia as concomitants. The need for close follow-up of LBW twin infants for early detection and management of any gross or subtle neuro-developmental handicaps is, therefore, obvious. Accurate determination of LBW and IUGR presumes the existence of an intrauterine growth chart for the study population. In this regard, there is a need for an intrauterine growth chart for Nigerian twins because LBW in twins is different from LBW in singletons and should be dealt with independently, especially from the point of view of follow-up and developmental assessment [8].

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