Low birthweight infants in twin gestation

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Abstract

Twin gestations are commonly associated with delivery of low birth weight infants. Despite the fact that Nigeria has the highest incidence of twinning in the world, there is paucity of information on the characteristics of LBW twin infants in Nigeria. This study was con-ducted to determine the incidence and document some of the characteristics of low birth weight (LBW) twin infants. A descriptive analysis of data on 119 LBW twin infants deliv-ered between 1st January, 2000 and 31st December, 2003 in a Nigerian mission hospital in Benin City was carried out. The characteristics of the LBW twin infants was studied in rela-tion to perinatal mortality. The overall prevalence rate of LBW twin infants was 51.7% with a female preponderance. Of the 107 live-born LBW twins, 74 (69.2%) were preterm and 33 (30.8%) term small-for-gestational age (SGA) infants respectively ($p<0.001$). Twen-ty six (35.1%) of the 74 preterms were very preterm (<32 weeks gestation), corresponding to 24.3% of all LBW twin infants. The associated perinatal mortality for the two categories of LBW infants were 21.6% for preterm and 9.1% for term SGA infants ($p>0.05$). Of the 119 LBW twin infants, 7.6% were extremelyLBW, 10.1% very LBW while 57.1% were low birth weight. Fifty one (42.9%) of LBW twin infants weighed less than 2000g. The risk of delivery of LBWtwin infants was significantly higher in primiparous women ($p<0.001$), as well as in mothers who were unbooked ($p<0.001$) or lacked formal education ($p<0.01$). Out of 107 live-born LBW twin pairs, 19 (17.8%) had birthweight difference = or > 20%, with 6 of the 19 (31.6%) exhibiting birthweight difference = or > 30%. In twin gestations, preterm delivery is a more important contributor to LBW than term SGA delivery with majority of these preterm infants delivered to primiparous mothers.

Keywords: Twins, Low birthweight, Primiparity, Growth discordance
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Introduction

In both developing [1,2] and developed [3] countries low birthweight (LBW) infants are at increased risk of perina-tal morbidity and mortality, with the risk being higher in the former [4]. Ashworth et al reported that a fall in inci-dence of LBW infant from 30 to 15 percent resulted in a drop in infant mortality by 25 percent [5]. Thus, empha-sizing the importance of strengthening strategies for pre-vention of LBW in developing countries, where the inci-dence is higher and the facilities for their care are often lacking [6].

Twin gestation is an important cause of LBW in Nigeria [7]. The reported incidence of LBW twin infants was 55.1% in Lagos [8] and 49.8% in Afikpo [9]. Incidence of LBW in twin gestations has been shown to change with time. For instance, at the University of Ilorin Teaching Hospital, the reported incidence of LBW twin infant was 46% in 1986 [10] but rose to 64.3% in 1993 [11]. Wheth-er the incidence has risen further, or has fallen, is not known with certainty. Data on baseline incidence and characteristics of LBW twin infants are therefore needed to define the current magnitude of the problem and plan strategies for prevention. Even in developed countries the documented incidence of LBW twin infants is as high as 50 to 60 percent, a figure that is five to seven times higher than the incidence of LBW in singletons. [12].

As part of Millennium Development Goals, effort to re-duce infant mortality rate in Nigeria must include strate-gies for reducing incidence of LBWinfants. Given the high incidence (33-53 per thousand deliveries) of twin gestation in Nigeria [13] and its significant contribution to the incidence of LBWin our society [7,14], planning of appropriate intervention programme for reduction of inci-dence of LBW must take into consideration strategies for reducing

prevalence of LBW twin infants. This can only be achieved if a current baseline data on the incidence and the socio-demographic risk factors for delivery of LBW twins are available.

The present study, therefore, sought to document the baseline incidence of LBW twin infants in Benin City and some of the characteristics of the infants and their moth-ers.

Materials and Methods

This cross-sectional study was conducted at St Philomena Catholic Hospital (SPCH), Benin City, Nigeria between 1st January, 2000 and 31st December, 2003. Dur-ing the study period, all twin babies delivered at SPCH were weighed naked, within the first 30 minutes after birth, by a trained midwife using a mechanical Waymas-ter weighing scale calibrated to the nearest 50 grammes. The scale was periodically standardized with known weights for reliability and checked daily for zero error to ensure accuracy. The birth order, weights, sexes and Ap-gar scores of the infants were recorded according to the month and year of delivery. Gestational age was deter-mined from the maternal dates and Dubowitz Scores, (15) obtained 12 to 24 hours after birth. Where a discrepancy of more than two weeks was observed, the gestational age was assigned from the Dubowitz score. The medical re-cords of these mothers were examined for antenatal care registrations and attendance, maternal age, parity, occupa-tion and educational attainment. The social class of the women were determined by combining a woman's educa-tional attainment with her husband's occupation as sug-gested by Olusanya et al. (16) In this Social Classification System, social classes I and II, social class III and social classes IV and V represent high, middle and low social classes respectively.

In this study, the following definitions were used: Discor-dance was defined as a difference in weight of 20% or more and was calculated as a percentage of the birth-weight of the heavier twin [discordance (%) = 100 (birthweight difference /birthweight of heavier twin]. Twin pairs were designated discordant-first or discordant-second depending on whether the smaller one was first- or second-born respectively. A small-for-gestational age infant was one whose birthweight was less than the tenth percentile for twins according to Cohen et al criteria [17]. A low birth weight (LBW) infant was one whose birth-weight was less than 2500g, regardless of gestational age [18]. An infant who was delivered before 37 completed weeks of gestation was accepted as preterm. (19) Chi square test and Z-test were used to ascertain the level of significance of differences, which was set at $p<0.05$.

Results

Of the 4,544 deliveries during the 4-year study period, 115 (2.5%) were sets of twins, resulting in 230 babies of which 119 (51.7%) were low birthweight (LBW) with a male to female ratio of 0.78:1. Twin gestation accounted for 31.2% of all LBW infants delivered in the hospital. Out of the 119 LBW twin infants, 12 (10.1%) were still-born, leaving 107 as live-born. LBW infants accounted for 85.7% of all stillbirths among twins. The 12 stillbirths comprised 9 (75%) fresh and 3 (25%) macerated still-births of which 5 (41.7%) and 7 (58.3%) were males and females respectively (M:F = 0.7:1). Distribution of sex-pair in LBW twin infants was as follows: (i) different sex 20 (33.9%); (ii) same-sex male 14 (23.7%); and (iii) same-sex female 25 (42.4%), giving a ratio of 1.4:1:1.8. In one twin pair (both females), the first-born weighed more than 2500g at birth while the second-born was a LBW infant. Comparing the prevalence rate of delivery of LBW twin infants in the dry and wet seasons, it was 2.1% versus 1.8%, corresponding to 52.1% and 47.9% of all LBWtwin infants respectively ($p<0.05$).

The prevalence rate of delivery of LBW twin infants ac-cording to maternal age and parity is summarized in Table I. There was no significant difference in prevalence rate of delivery of LBW twins in relation to maternal age. Comparing primiparous with multiparous women, the risk of delivery of LBW twin infant was significantly higher in the former ($p<0.001$). Similarly, grand multiparous women also showed significantly higher risk than their multiparous counterparts ($p<0.01$). Formal education and unbooked status in the mother were significant risk fac-tors for delivery of LBW twin infants ($p<0.001$) (Ta-ble.1). Table II summarizes the number of cases seen in each birthweight category. Mean birthweight of the study population was 1968g (95% Confidence Interval, CI=1889-2047g). Seventy four (69.2%) of all live-born LBW twins were preterm rather than term SGA infants 33 (30.8%) Z-statistic = 3.974 $p<0.001$; Figure 1. Distri-bution of the 74 preterm LBW twin infants according to maternal parity was as follows: (i) primiparous 50 (67.6%); (ii) multiparous 8 (10.8%); and (iii) grand mul-tiparous 16 (21.6%); primiparous versus multiparous women: Z-statistic = 3.529 $p<0.001$. Grand multiparous versus multiparous women: Z-statistic= 0.714 $p>0.05$; Figure 2. With regard to perinatal deaths, no significant difference between male and female LBW twin infants ($p>0.05$). Perinatal mortality rate (PMR) was 21.6% in preterms, corresponding to 84.2% of all perinatal deaths amongLBW twin infants. Comparing very preterm (ges-tational age 28-32 weeks) infants with their counterparts with gestational age of 33-36 weeks, PMRwas signifi-cantly higher in the former ($p<0.001$). The prevalence rate of birth asphyxia was 15.0% among LBW twin infants compared to an overall prevalence rate of 8.4% in the same institution

during the study period. Out of a total of 107 live-born twin pairs, 19 (17.8%) had birth weight difference >20%, with the degree of growth discordance being 30% or more in 33.3% of cases. Of the nine with percentage birth weight difference greater than 25%, 6 (66.7%) and 3 (33.3%) were discordant-first and discor-dant-second twins respectively and their distribution by sex-pair was as follows: (i) different sex 3 (33.3%); (ii) same-sex female 4 (44.4%); and same-sex male 2 (22.3%), corresponding to a ratio of 1.5 : 2 : 1.

Table 1. Prevalence rate of LBW and maternal characteristics

Maternal characteristics	Total delivery No. (%)	LBW Twin infants No. (%)	Test of significance
Age (years)			
≤ 19[a]	109 (2.4)	5 (4.2)	a vs b: $x^2 = 2.096$ p>0.05
20 – 34[b]	3742 (82.4)	90 (75.6)	
≥ 35[c]	668 (14.7)	22 (18.5)	
Unknown	25 (0.5)	2 (1.7)	
Total	4544 (100)	119 (100)	
Parity			
0[d]	1478 (32.5)	74 (62.2)	d vs e $x^2 = 30.272$ p<0.0001
1 – 4[e]	2605 (57.3)	17 (14.3)	
≥ 5[f]	461 (10.2)	28 (23.5)	
Total	4544 (100)	119 (100)	
Educational level			
No schooling[g]	539 (11.7)	55 (46.2)	
Primary	1360 (29.9)	35 (29.4)	e vs f $x^2 = 9.360$ p>0.05
Secondary[h]	2067 (45.5)	24 (20.2)	
Post – secondary	586 (12.9)	5 (4.2)	
Total	4544 (100)	119 (100)	
Social class			g vs h $x^2 = 11.893$ p<0.05
I	383 (8.4)	8 (6.7)	
II	527 (11.6)	13 (10.9)	
III	1149 (25.3)	20 (16.8)	
IV	1500 (33.0)	31 (26.1)	k vs l $x^2 = 23.972$ p<0.001
V	985 (21.7)	47 (39.5)	
Total	4544 (100)	119 (100)	
Booking status of mothers			High vs low social class $x^2 = 1.539$ p>0.05
Booked[k]	3508 (77.2)	69 (58.0)	
Unbooked[l]	1036 (22.8)	50 (42.0)	
Total	4544 (100)	119 (100)	

Table 2. Characteristics of LBW twin infants and related perinatal deaths.

Characteristics of LBW twin in-fants	LBW twin in-fants No (%)	Perinatal deaths No (%)	
Birth-weight categories (g)			
< 1000	9 (7.6)	9 (100)	a vs b $x^2 = 0.442$ p>0.05
1000 – 1499	12 (10.1)	10 (83.3)	
1500 – 1999	30 (25.2)	9 (30.0)	
2000 – 2499	68 (57.1)	3 (4.4)	
Total	119 (100)	31 (26.1)	
Birth order			
First – born twin[a]	56 (47.1)	13 (23.2)	
Second – born twin[b]	63 (52.9)	18 (28.6)	c vs d $x^2 = 2.115$ p>0.05
Total	119 (100)	31 (26.1)	
Sex			
Male[c]	52 (43.7)	17 (33.0)	
Female[d]	67 (56.3)	14 (20.9)	
Total	119 (100)	31 (26.1)	
Type of LBW (live – born)		**Neonatal deaths (%)** No	e vs f $x^2 = 3.635$ p>0.05
Preterm[e]	74 (69.2)	16 (21.6)	
Term SGA[f]	33 (30.8)	3 (9.1)	

Total	107 (100)	19 (17.8)	
Gestational age weeks (live – born)			
28 – 32[g]	26 (24.3)	14 (53.8)	g vs h x^2 = 18.520 p<0.01
33 – 36[h]	47 (43.9)	4 (8.5)	
≥ 37	34 (31.8)	1 (2.9)	
Total	107 (100)	19 (17.8)	
Birth asphyxia (live-born)			
Yes	16 (15.0)	6 (37.5)	
No	91 (85.0)	13 (14.3)	
Total	107 (100)	19 (17.8)	

Figure 1. Distribution of LBW twin infants

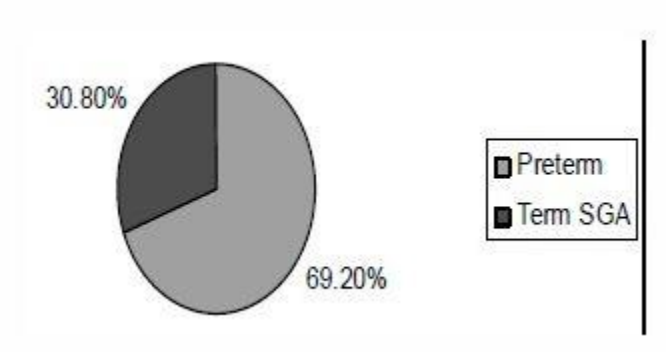
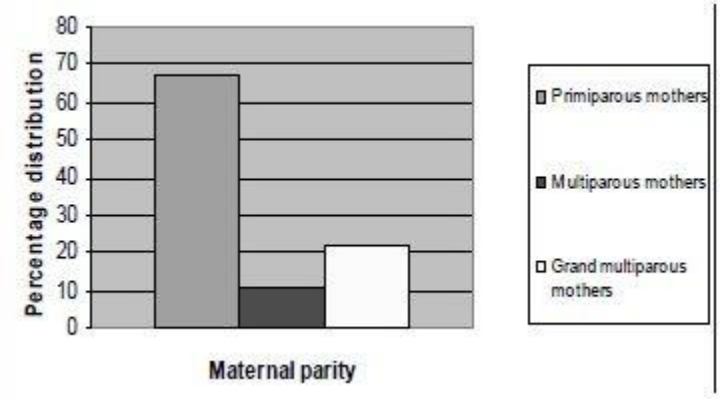


Figure 2. Distribution of delivery of preterm LBW twins by maternal parity



Discussion

The 51.7% overall prevalence rate of delivery of LBW infant in twin gestations reported here is close to 49.8% reported from a another mission hospital in Afikpo but lower than 63.4% and 55.1% reported previously from two Nigerian teaching hospitals in Ilorin (11) and Lagos (8) respectively. On the other hand, it was higher than 43.4% reported from Boston, USA [19]. The lower prevalence rate found in the present study may be accounted for by the fact that data from Ilorin and Lagos were derived from teaching hospitals. Traditionally, teaching hospitals are referral centres, therefore more cases of pregnancies asso-ciated with intrauterine growth restricting factors are more likely to be referred to them, resulting in higher pre-valence rate. Such referral-bias is known to increase the incidence of medical conditions [20]. The lower preva-lence rate reported from Boston, USA, may be due to bet-ter maternal nutrition and utilization of antenatal care ser-vices. This view was supported by the significantly higher rate of delivery of LBW twin infants among unbooked mothers compared to their booked counterparts in the pre-sent study. 69.20%30.80%PretermTerm SGA Our data indicated that maternal parity has a significant influence on the rate of delivery of LBW infants in twin gestations. As in previous studies, [10,11,21] the preva-lence rate was higher in primiparous compared with their multiparous counterparts, suggesting that the uteri of mul-tiparous women are more

efficient in nurturing and pro-moting intrauterine growth of twins; accounting for the relatively lower prevalence rate of LBW twin infants among them.

Teenage twin mothers demonstrated an increased risk of delivery of LBW infants. A similar finding has been re-ported from Ilorin [11]. Teenage twin mothers may not have the necessary financial and emotional support from their spouses, and so, were less likely to utilize and bene-fit maximally from available maternal health care ser-vices. This was supported by the adverse effect of mater-nal unbooked status on birthweight reported in this study.

In twin gestations, prematurity is a more important con-tributor to delivery of LBW infant than term SGA. This finding strongly challenges the report of some studies which stated that majority of LBW infants in developing countries were due to term SGA rather than preterm de-livery. (22,23) The risk of perinatal death was higher in very preterm infants, suggesting that there is a need to make effort to prolong gestation beyond 32 weeks. One way of achieving this, is by instituting a prophylactic hospitaliza-tion policy (bed rest) for all women with twin pregnancy between 28 and 32 weeks gestation. The usefulness of such an approach has been reported by Younis et al [24].

Although the number was small, LBW twin pairs tended to demonstrate extreme degree of intrapair growth discor-dant (birthweight difference >30%). In the present study, this was the case in 31.4% of all cases of discordant LBW twin infants. An explanation for this finding may be found in the report of Blackstein et al [25] which stated that low birthweight sum in twin pairs was associated with extreme levels of intrapair growth discordance. Some investigators [26,27] have shown that the perinatal risks from birthweight discordance were greater when the infants were LBW compared to when they were of normal birthweight, further emphasizing the need to evaluate every LBW twin pair for growth discordance to improve perinatal health.

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