

Original article

Twin delivery: incidence and perinatal outcome in a Nigerian mission hospital

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Abstract

Background: The incidence of twin delivery in Nigeria may have changed, in view of the worldwide increase in the rates of twinning attributed to increasing maternal age and use of fertility therapies. Twin gestation is associated with increased risk of adverse perinatal outcome. **Objective:** To determine the current incidence of twin delivery in Benin City and document their perinatal outcome. **Methods:** A four-year cross-sectional study of twin deliveries in a Nigerian mission hospital was conducted. The perinatal outcome in 115 sets of twin was compared with that of 230 singleton controls. **Results:** The current incidence of twin delivery was 25.3 per 1000 deliveries or one in 40 births. Sex ratio was 0.98 : 1 in favour of females. The highest incidence was in the month of August while the lowest incidence was in the month of November ($p < 0.05$). Twin pregnancies are at a significantly higher risk of adverse perinatal outcome such as low birthweight (LBW), preterm delivery, birth asphyxia and Caesarean delivery compared to singleton pregnancies ($p < 0.001$). **Conclusions:** Although the incidence of twin delivery remains high in Benin City, it appears to have dropped. Twin pregnancy is associated with a significantly increased risk of delivery of preterm and low birthweight infants as well as birth asphyxia.

Keywords: Twins delivery, incidence, perinatal outcome, Nigeria.

Introduction

Perinatal morbidity and mortality rates are higher in twins compared to singletons. For instance, a need for resuscitation, intrauterine growth restriction, preterm delivery, congenital malformations and perinatal deaths are all known to be commoner in twins than in singletons.¹⁻⁴ In addition, morbidities such as fetofetal transfusion syndrome (FFTS), intrapair birthweight discordance and conjoined twins are peculiar to twins.^{1,2,5}

Incidence of twin delivery shows considerable ethnic and geographic variations. For instance, the reported incidence of twin delivery among the Yorubas in Nigeria was more than four times that of Caucasian populations. In Nigeria, the reported rates of twin delivery varied from 28 per 1000 deliveries in the North⁷ to 54 per 1000 deliveries in the West⁸ with an intermediate rate of 33 per

1000 deliveries in Benin City.⁴ Other African countries have an average overall rate of 20 per 1000 deliveries.⁴ The rate ranged from 6 per 1000 deliveries in Asia to 11 per 1000 deliveries in Europe⁴ and America.⁹ From the 1980s, there has been a worldwide increase in the rates of twinning attributed to increasing maternal age and use of fertility therapies.^{4,9-12} In Nigeria, maternal age of our obstetric population seems to be increasing¹³ and majority of the twin gestations are spontaneously conceived.⁴ On the other hand, spontaneously conceived twins have actually been decreasing during the past couple of decades.² It may, therefore, be surmised that in Nigeria twin delivery rate have changed over time. This study, therefore, sought to determine the rate of twin delivery in Benin City and also document their perinatal outcome.

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Materials and methods

This descriptive (cross-sectional) study was conducted at St Philomena Catholic Hospital (SPCH), Benin City. The hospital has a large maternity unit with an average of 1,344 deliveries annually.¹⁴ It was chosen for the study because of its central location and non-selection of cases which was shown by the fact that the social stratification pattern of women attending the hospital was more representative of the overall pattern in Benin City. This was revealed in a survey in 1983.¹⁵

During the four-year study period, 1st January, 2000 to 31st December, 2003 all twin babies delivered at SPCH were weighed naked, by a trained midwife, within the first hour after birth, using a mechanical Waymaster weighing scale calibrated to the nearest 50 grammes. The scale was checked and standardized, using standard weights by a technician and it was also checked daily for zero error throughout the period of the study to ensure accuracy. The weights and sexes of the twin (study) babies were recorded according to the month and year of delivery. Gestational age was determined by maternal dates and by Dubowitz method¹⁶ and if a discrepancy of more than two weeks was observed the later was used. The Apgar scores were determined by the attending physician and/or the trained midwife present at the delivery using the Apgar Scoring System.¹⁷ Other perinatal outcome measures of interest included mode of delivery, stillbirth rate and the need for admission into the Special Care Baby Unit (SCBU). Indication(s) for such admission was determined by the attending physician since the hospital had no specific management policy for twin pregnancies during the study period. For each set of twin babies delivered, two cases of singleton babies delivered consecutively following the twin delivery were recruited as controls. Similar perinatal outcome measures were documented for the control babies and were compared with those of

twin (study) babies. The haematocrit/haemoglobin values of each set of twin babies were determined and documented at birth. Data on total number of deliveries was obtained from the relevant delivery registers of the hospital. Maternal age and parity were also documented.

Definition of terms used and statistical methods

A preterm infant was one delivered before 37 completed weeks of gestation. A low birthweight (LBW) infant was one whose birthweight was less than 2500g, regardless of gestational age. Birth asphyxia referred to Apgar score of less than seven at one minute. Intrapair birthweight difference equal or greater than 20% of the birthweight of the heavier twin was accepted as birth weight discordance. Feto-fetal transfusion syndrome was diagnosed when a given set of twins exhibited a haemoglobin difference of more than 5g per 100ml at birth. Using the criteria suggested by Marivate and Norman,¹⁸ intrauterine growth restriction (IUGR) was diagnosed in a twin when the birthweight was less than the tenth percentile for gestational age on the singleton weight curve or when the birthweight is less than 85 percent of the birth weight of the co-twin, even if the smaller twin's birthweight was above the tenth percentile. The season was defined as wet season (May to October) and dry season (November to April). The chi-square test and the Student's t test were used in ascertaining the level of significance of two differences, which was set at $p < 0.05$.

Results

Incidence of twin delivery

Twin delivery occurred in 115 of 4,544 deliveries for an incidence of 25.3 per 1000 deliveries, corresponding to 1 in 40 births. Sex ratio was 0.98: 1 in favour of females. Only one of the 115 (0.9%) women who delivered twins had a history of ovulation induction with clomiphene, the rest 114

(99.1%) were conceived spontaneously. Comparing the incidence of delivery of twins during the wet and dry seasons, it was 2.7% (63/2330) versus 2.3% (52/2214) $\chi^2 = 0.581$ $p > 0.05$. Peak incidence, 58.8 per 1000 deliveries (20/340), was in August, accounting for 17.4% of total twin deliveries. The lowest incidence, 15.0 per 1000 deliveries, (5/333), was in November, accounting for only 4.3% of total twin deliveries $\chi^2 = 12.680$ $p < 0.05$. Majority (80.9%) of mothers who delivered twins were aged between 25-39 years with peak incidence in 35-39 years age group. Further details are shown in Table 1. Comparing mean maternal age of twin and singleton mothers it was 27.9 years (95% confidence interval, CI = 27.2 - 29.8) versus 27.3 years (95% CI = 26.6 - 29.2) t-statistic = 0.93 $p > 0.05$.

As shown in Table II, the incidence of delivery of twins was similar in primiparous and multiparous women. Two of the 115 (1.7%) mothers of twins had a history of previous delivery of a set of twins. None of the women who delivered twins was a twin herself.

Perinatal Outcome

Of the 115 sets of twins, 73 (63.5%) were same-sex (36 male and 37 female sets) while 42 (36.5%) were different-sex twins. Retention of the second twin occurred in nine of the 115 (7.8%) twin deliveries. Of the 14 stillbirths (seven males and seven females) in the study group, both twins died in three cases (a total of six babies) while the remaining eight stillbirths consisted of one from each set of twins. As a result, analysis of other perinatal outcome measures in the study (twin) group involved 104 sets of live-born twins and a total of 216 (107 males and 109 females) live-born babies. For the control group there were three stillbirths, leaving 227 (119 males and 108 females) live-born babies for comparison.

Comparing stillbirth rates in twin and singleton pregnancies, it was 60.9 versus

13.0 per 1000 deliveries, with an odd ratio of 4.7 (95% CI = 0.57-1.95). Of the 14 stillbirths, six (42.9%) were from different-sex sets of twins while the remaining eight (57.1%) were from same-sex set of twins. Eleven of the 14 (78.6%) stillbirths in the study group were fresh while the remaining three (21.4%) were macerated stillbirths. For the control group, one of the three (33.3%) stillbirths was fresh while two (66.7%) were macerated stillbirths.

When the birthweight of the heaviest male twin neonate was compared with his singleton counterpart, it was 3800g versus 5800g, a different of 2000g. The birthweight of the heaviest female twin neonate was 3650g compared to 5650g for her singleton counterpart. Further details are shown in Table III. As shown in Tables IV and V, for each year of study, the mean birthweight was higher in a singletons compared to twins, even after controlling for gender. Of the 115 sets of twins, 26 (22.6%) showed intrapair birthweight discordance with 16 (61.5%) being same-sex twin pairs while ten (38.5%) were different-sex twin pairs. Five of the 16 (31.3%) same-sex set of twins were males and the remaining 11 (68.7%) were females. Two of the 104 (1.9%) sets of live-born twins had fetofetal transfusion syndrome (FFTS).

Of the 66 asphyxiated babies in the study (twin) group, 52 (78.8%) had mild to moderate degree of birth asphyxia while remaining 14 (21.2%) had severe form (Apgar score ≤ 3 at one minute). For the control group, three out of the four (75.0%) asphyxiated babies had mild to moderate birth asphyxia while one (25.0%) had severe form. Although the incidence of mild to moderate birth asphyxia did not differ with birth order of the twins, the risk of severe birth asphyxia was three times higher in the second compared to the first twin. Further details on perinatal outcome measures are shown in Table VI.

Table-I: Incidence of twin delivery according to maternal age

Maternal age group (years)	Total No of deliveries	No of twin deliveries	Percent of twin deliveries
15-19 ^a	109	1	0.9
20-29 ^b	2406	58	2.4
30-39 ^c	1910	52	2.7
≥ 40 ^d	94	3	3.2
Unknown	25	1	4.0
Total	4544	115	2.5

* Percentage of total delivery

b versus c $\chi^2 = 0.416$ $p > 0.05$

b versus d $\chi^2 = 0.232$ $p > 0.05$

Table-II: Incidence of twin delivery according to maternal parity

Maternal Parity	Total No of deliveries	No of twin deliveries	Percent of twin deliveries
0 ^a	1478	42	2.8
1-4 ^b	2605	65	2.5
≥ 5 ^c	461	8	1.7
Total	4544	115	2.5

* Percentage of total deliveries

b versus a $\chi^2 = 0.443$ $p > 0.05$

b versus c $\chi^2 = 22.653$ $p > 0.001$

Table-III: Distribution of live-born twin babies by birth weight categories

Birthweight groups (grammes)	No of live-born twin babies	Percent of twin babies
< 1000	6	2.8
1000-1499	9	4.2
1500-1999	26	12.0
2000-2499	66	30.6
2500-2999	74	34.2
3000-3499	25	11.6
3500-3999	10	4.6
≥ 4000	0	0
Total	216	100

Table-IV: Comparison of mean birthweight of male live-born twin and singleton babies

Year of Study	Twin Babies		Singleton Babies		t-statistic (P value)
	No	MBWT (SD)g	No	MBWT (SD)g	
2000	28	2210 (402)	31	3199 (512)	8.29 (<0.001)
2001	29	2334 (436)	34	3283 (538)	7.73 (<0.001)
2002	23	2530 (510)	25	3281 (566)	4.84 (<0.01)
2003	27	2656 (524)	29	3340 (535)	4.83 (<0.01)
Total	107	2426 (486)	119	3276 (550)	12.33 (<0.001)

MBWT (SD)g = Mean Birthweight (Standard deviation) grammes

Table-V: Comparison of mean birthweight of female live-born twin and singleton babies

Year of Study	Twin Babies		Singleton Babies		t-statistic
	No	MBWT (SD)g	No	MBWT (SD)g	(P value)
2000	29	2168 (465)	27	3141 (576)	6.92 (<0.001)
2001	30	2140 (428)	30	3071 (487)	7.87 (<0.001)
2002	25	2515 (488)	27	3081 (530)	4.01 (<0.02)
2003	25	2526 (409)	24	3146 (535)	4.54 (<0.01)
Total	109	2323 (412)	108	3112 (492)	12.80 (<0.001)

Table-VI: Comparison of perinatal outcome in twin and singleton pregnancies

Parameters	Twins	%	Singleton	%	χ^2 (P value)
No. of livebirths	n=230	93.9	n=230	98.7	7.39 (>0.05)
No. of stillbirths	n=230	6.1	n=230	1.9	11.39 (<0.05)
Early neonatal deaths	n=216	6.0	n=230	1.3	7.38(>0.05)
Preterm delivery	n=216	53.7	n=227	11.9	88.51(<0.001)
IUGR	n=216	10.6	n=227	3.5	8.63 (>0.05)
LBW	n=216	66.2	n=227	18.1	105.64 (<0.001)
Birth asphyxia	n=216	30.6	n=227	1.8	68.97 (<0.001)
Caesarean delivery	n=115	40.0	n=230	13.0	32.80 (<0.001)
SCBU admission	n=216	62.8	n=227	13.7	116.46 (<0.001)

*Percentage of n

IUGR=Intrauterine Growth Restriction, LBW=Low Birth Weight, SCBU=Special Care Baby Unit

Discussion

The incidence (25.3 per 1000 deliveries) of twin delivery reported herein was lower than the 33 per 1000 deliveries previously documented at the University of Benin Teaching Hospital (UBTH), Benin City.³ This difference may be partly accounted for by the fact that UBTH being traditionally a referral centre, may have more twin pregnancies referred to it for antenatal care and delivery, resulting in referral bias. Referral-bias is known to increase incidence of medical conditions.¹⁹ In view of this, it is possible that the incidence of twin delivery reported in the present study was more representative of the true figure in Benin City since St. Philomena Catholic Hospital (SPCH) caters for all categories of pregnant women as revealed in a survey by Olusanya et al.¹⁵ On the other hand, the lower incidence found in the present study may indicate an actual fall in rate of twin delivery in Benin City. This view is supported by data from a previous study by Marinho et al.²⁰ which

showed a fall in rate multiple births in Ibadan and Igbo-Ora in Nigeria. The fact that almost all (99.1%) of the twin births in the present study were spontaneously conceived may have also contributed to our lower incidence. Indeed, a decline in rate of spontaneously conceived twins have been documented recently.²

The incidence of twin delivery was significantly higher in multiparous compared to their grand multiparous counterparts. Nutrition may be less optimal in grand multiparous mothers compared to their multiparous counterparts because of higher number of previous pregnancies/deliveries, especially if in quick succession which may have exhausted the former nutritionally. Along with a woman's gene, good nutrition is known to play a role in the natural conception of twins.²

In the present study, the probability of twin birth was highest in August but lowest in November. In contrast, report from both England and the United States indicated

that twin delivery rate was highest in November.² In the same report, the lowest twin delivery rates in England and the United States were in May and April respectively.² The reason for this finding is not clear but it has been speculated that environmental influences may affect the egg, the uterine environment, or both,² accounting for differences in incidence in the various months.

In consonance with previous studies,^{1,7-21,22} the incidence of delivery of a low birthweight (LBW) as well as a preterm infant was significantly higher in twin compared to singleton pregnancies. This may be explained by the fact that sharing one uterus by two foetuses represents a struggle for space so that as pregnancy advances, the uterus becomes a crowded environment apart from the problem of placentation and sharing of nutrients. Stretch of the uterine musculature especially by twins plays a role in eliciting uterine contractions of parturition.²³ The pituitary gland of the foetus also secretes oxytocin (greater in twins) that could possibly play a role in exciting the uterus, initiating labour. These two mechanisms lead to initiation of and delivery of preterm/low birthweight infants. Prematurity was a major factor influencing the morbidity and mortality in twin pregnancies, largely accounting for a greater percentage of admission into the Special Care Baby Unit (SCBU) of the hospital. The implication of the increased neonatal admission is that it will stretch the human and material resources of the in-patient services of the hospital, apart from the requirements for the comparatively increased rate of caesarean delivery and neonatal resuscitation in cases of birth asphyxia reported herein. Prematurity and LBW are co-variant factors. Although, not statistically significant, using the criteria

suggested by Marivate and Norman,¹⁸ the incidence of intrauterine growth restriction (IUGR) was three times higher in twins than in singletons but lower than the ten-fold increase reported by Manlan et al.²⁴ A previous study³ on twin deliveries in UBTH was silent on the issue of IUGR, thereby making comparison impossible. The reason for IUGR in twin gestations may be found in the study by Guaschino et al which showed that 33% of twin pregnancies was associated with IUGR-predisposing factors such as inadequate placentation, unequal sharing of placental mass, chronic malnutrition and anaemia.²⁵ Maternal dietary supplementation in pregnancy has the potential of preventing the last two factors, thereby reducing incidence of IUGR.²⁶ Mean birthweight was significantly lower in twins compared to singletons. Other investigators have reported similar findings.^{4,7}

In consonance with a previous report,³ the risk of stillbirth was higher in twin than singleton pregnancies. Implantation, placentation and birth all present foetal survival issues that are more of a challenge to twins than to singletons,² accounting for the higher foetal wastage in twin than in singleton pregnancies.

In conclusion, the incidence of twin delivery though still high in Benin City appears to have dropped. Perinatal outcome measures such as prematurity, low birthweight and birth asphyxia were significantly more adversely affected in twin than in singleton pregnancies. It is recommended that all twin pregnancies should be supervised in health institutions with facilities for the care of the preterm infant. Personnel skilled in neonatal resuscitation should be present at all twin deliveries.

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