ORIGINAL ARTICLE

Pregnancy outcome and factors affecting vaginal delivery of twins at University of Nigeria Teaching Hospital, Enugu

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Abstract

Objective: The study aims to determine the differences in maternal and perinatal outcomes between caesarean and vaginal deliveries and the factors affecting vaginal delivery in twin pregnancy.

Materials and Methods: An observational study to audit twin pregnancies delivered at the University of Nigeria Teaching Hospital between 2002 and 2008. Clinical observations were entered into a questionnaire immediately after the delivery of the women and the mothers and their babies were followed up until the end of the puerperium.

Results: There were 5298 deliveries within the study period, out of which 117 were twin deliveries. This gives a twinning rate of 22 per 1000 deliveries. The mean age of the mothers was 30 ± 5.9 years. Twenty-five (21.4%) women were admitted into the hospital for preterm labor. The average gestational age of admission was 32 ± 5.8 weeks and the average duration of hospital stay for preterm labor was 12.6 ± 9.1 days. Other pregnancy complications observed were severe hypertension (14.5%, anemia (9.4%), postpartum hemorrhage (8.5%), puerperal fever (5.1%), abruptio placentae, and diabetic mellitus (2.7%). Fifty-nine women (50.4%) had vaginal deliveries, 5 (4.3%) had vaginal delivery of the leading twin and caesarean delivery of the retained second twin while 53 women (45.3%) were delivered by caesarean section. Forty-eight (41%) women had preterm delivery. Vaginal deliveries were more common than caesarean section among patients that were unbooked than booked $P = 0.047$ (OR 2.26, 95%CI:0.93-5.53) and those that had cephalic presentation of the leading twin, $P = 0.0002$ (OR = 4.7 95% CI:2.6-8.2). Vaginal delivery tended toward statistical significance when the fetal weight of the leading twin was 1.5 to 2.5 kg, $P = 0.09$. The commonest indications for caesarean section were abnormal lies and presentations and hypertension in pregnancy.Two-hundred and seventeen (92.7%) out of a total of 234 fetuses that were delivered in this study were live births and 17 (7.3%) still births. The rate of new born admissions in twin 1 was however higher in those delivered by Caesarean section (39.6%) than those delivered vaginally (29.7%). Indications for admissions into the special baby care units were; prematurity 33 (40.2%), birth asphyxia 15 (18.3%), low birth weight 12 (14.6%), neonatal jaundice 10 (12.2%), and twin-twin transfusion 4 (4.9%). There was a higher rate of early neonatal death in both vaginally delivered twin 1 (9.4%) and twin 2 (11.9%) than those delivered by Caesarean section, 3.8 and 3.5%, respectively.

Conclusion: Cephalic presentation of the leading twin, birth weight less than 2.5 kg, and unbooked women presenting in advanced labor predisposed to vaginal delivery in twin pregnancies. There was however increased risk of still birth and early neonatal deaths especially for the leading twin in vaginal deliveries in unbooked women.

Key words: Maternal and neonatal outcome, mode of delivery, twin pregnancy

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Introduction

There has been an increasing trend in the incidence of multiple pregnancies globally. This is attributable to increasing practice of assisted reproduction and delayed age of marriage as older women are at greater risk of having multiple pregnancy.[1] Monozygotic twins have a uniform incidence of about 3-5 per 1000 across the world. Dizygotic twinning shows regional variations and the highest incidence of 49 per 1000 occurs in Nigeria.[2,3] Multiple pregnancy is associated with increased risk of antenatal and peripartum complications and the babies show increased need for intensive neonatal care and are at higher risk of neonatal morbidity and mortality.[4-7] Individual twins have at least three times increased risk of perinatal death than singleton babies.[4] Low birth weight and prematurity are the main factors responsible for this. Other contributing factors are malpresentation and hazards of delivery. Hence, twin pregnancies are regarded as high risk and often a source of concern and challenge to the obstetrician.

The best method of delivery for twins remains controversial. Planned caesarean delivery has been advocated by some as adverse perinatal outcome for term or near term twins is worse in twins delivered vaginally than those delivered by caesarean section.[5,8] This however was not supported by studies that did not identify any significant difference in the perinatal outcome of twins delivered by planned caesarean delivery when compared to those delivered vaginally.[9,10] Systematic review and meta-analysis by Hogle *et al.* found no significant difference in perinatal mortality and morbidity and maternal morbidity between planned caesarean section and vaginal delivery,[11] hence could not recommend any preferred method of delivery.

In our environment where there is paucity of resources and strong aversion for caesarean delivery, vaginal delivery would be more acceptable. This study aims to determine the predictors of vaginal delivery in twin pregnancy and differences in maternal and neonatal outcome between caesarean and vaginal deliveries.

Materials and Methods

An observational study to audit twin pregnancies delivered at the University of Nigeria Teaching Hospital between 2002 and 2008 was done. Clinical observations and other relevant patients' data were entered into a questionnaire immediately after the delivery and the mothers and their babies were followed up until the end of the puerperium. The data included patients' names and hospital numbers, their demographic characteristics, data on complications of pregnancy, labor and purperium such as hypertension in pregnancy, diabetes mellitus, placentae previa or abruption, preterm labor, Hospital admissions and the need for tocolytics, gestational age at delivery, retained second twin or placenta, postpartum hemorrhage, and purperial fever. In this study, preterm delivery is any delivery before 37 completed weeks, anemia is blood hemoglobin concentration of less than 11 g/dl, puerperal fever is the rise in body temperature up to 38°C and above in two consecutive occasions after 24 h of delivery, post partum hemorrhage is vaginal bleeding of 500 ml or more after vaginal delivery or loss of more than 1000 ml of blood during caesarean section.

Fetal presentations were determined using clinical examination and ultrasound scan at term. Neonatal live status, sex, Apgar score at 5 min, birth weight, need for new born admissions, twin – twin transfusion which was defined clinically based on differences in hemoglobin concentration of up to 5 g/dl and birth weight of up to 20% between the babies and other neonatal complications were recorded. Descriptive analysis of the obtained data was done using percentages and means. Statistical significance was done utilizing Chi-square test at 95% confidence level and odd ratio was determined by multivariate logistic analysis. Statistical significance was considered present where *P* value was 0.05 or less. Data entry and analysis utilized SPSS Version 17 for windows (SPSS Inc, Chicago IL, USA).

Results

A total of 117 parturient that had twin pregnancy delivered at the University of Nigeria teaching hospital between 2002 to 2008. Table 1 shows the maternal characteristics and the method of delivery of the twins. The mean age of the mothers was 30 ± 5.9 years. Most of them were multiparous (58.2%)

Table 1: Maternal characteristics according to mode of delivery of 112 parturient

Characteristics	Vaginal (*n*=59) (%)	Caesarean (*n*=53) (%)	Total (*n*=112) (%)	*P* value: OR (95% CI)
Maternal age				
20-24	6 (10.2)	8 (15.1)	14 (12.5)	0.70:0.8 (0.2-2.7)
25-29	21 (35.6)	17 (32.5)	40 (35.7)	0.60:1.2 (0.5-2.8)
30-34	18 (30.5)	16 (30.2)	36 (32.1)	0.97:1.0 (0.4-2.5)
35 and above	14 (23.7)	12 (22.6)	26 (22.2)	0.89:1.1 (0.4-2.8)
Parity				
Para 0	15 (25.4)	15 (28.3)	30 (26.8)	0.73:0.9 (0.3-2.2)
Para 1-4	31 (52.5)	32 (60.4)	68 (60.7)	0.41:0.7 (0.3-1.7)
Para 5 and above	13 (22.1)	6 (11.3)	19 (17.0)	0.13:2.2 (0.7-7.7)
Level of education				
None	2 (3.4)	1 (1.9)	4 (3.6)	0.54:1.8 (0.09-109)
Primary	12 (20.3)	6 (11.3)	19 (17.0)	0.19:2.0 (0.6-6.6)
Secondary	21 (35.6)	24 (45.3)	47 (42.0)	0.09:0.5 (0.2-1.2)
Tertiary	24 (40.7)	22 (41.5)	47 (42.0)	0.9:0.97 (0.4-2.2)
Booking status				
Booked	34 (57.6)	40 (75.4)	76 (67.9)	0.05:0.44 (0.2-1.1)
Unbooked	25 (42.4)	13 (24.5)	41 (36.6)	0.047:2.26 (0.9-5.5)

and 25.5% were primigravidae. Seventy-six women (65%) booked and received antenatal care in the hospital while 31 (45%) others were unbooked and referred either by self, from maternity homes or private hospitals. Fifty-nine women (50.4%) had vaginal deliveries, 5 (4.3%) had vaginal delivery for the leading twin and caesarean section for the retained second twin and 54 women (42.3%) were delivered by elective or emergency caesarean section. The mean gestational age of delivery was 36.2 ± 3.2 weeks.

Forty-eight (41%) mothers had preterm deliveries making it the commonest complication observed among the studied subjects. Other complications observed in twin pregnancies were severe hypertension (14.5%), anemia (9.4%), postpartum hemorrhage (8.5%), puerperal fever (5.1%), abruptio placentae, and diabetic mellitus (2.7% respectively). No maternal mortality was recorded in the women reviewed. Caesarean section was statistically significant mode of delivery for twin pregnancy complicated by hypertensive *P* value 0.02 (OR 0-25: 95%CI, 0.08-0.83).

Table 2 shows the indications for the caesarean sections. The most common indications for caesarean section were abnormal lie, malpresentation, and hypertension in pregnancy. A total of 13 out of 17 (76.4%) women that had associated hypertension and 15 out of 48 (31.5%) that had abnormal lie and malpresentation of the first twin had caesarean section. There was significantly higher number of vaginal deliveries among patients that were unbooked (*P* = 0.047, OR 2.26, 95% CI: 0.93-5.53) and those that had cephalic presentation of the leading twin (*P* = 0.0002, OR = 4.7 95% CI: 2.6-8.2). Vaginal delivery tended toward statistical significance when the fetal weight of the leading twin was less than 2.5 kg (P = 0.09).

Tables 3 and 4 show the neonatal characteristics and outcome of twins 1 and 2. The predominant fetal presentation in both twin 1 (62.4%) and twin 2 (59.8%) was cephalic. There was preponderance of female fetus in twin 2 (65:52) while in twin 1 both sexes occurred in almost the same proportion (58:59 female to male). The mean birth weight of the leading twin was 2.5 ± 0.8 with range of 4.4 kg and that of the second twin was 2.4 ± 0.75 with range of 3.0 kg. There were 107 live births and 10 still birth in twin one and 110 live births and 7 still births in twin 2. Seventeen babies died in the early neonatal period, 8 and 9 of twin 1 and twin 2, respectively. Nineteen (55.9%) cases of still birth and early neonatal deaths babies were delivered to unbooked mothers giving perinatal mortality of 463/1000 while 15 (44.1%) of these were by booked mothers giving perinatal mortality of 197/1000. A total of 82 new born babies were admitted into the special baby care unit of the hospital. Prematurity was responsible for 33 (41%) cases and was the commonest reason for new born admission. Fifteen babies had birth asphyxia, 12 had low birth weight and 10 neonatal jaundice. Twin-twin transfusion was responsible for four cases. Neonates delivered by caesarean section appear to have better outcome than those delivered vaginally. Nine out of the ten still births in twin 1 were delivered vaginally and only one was delivered by caesarean section. This difference was statistically significant *P* value 0.02, odd ratio 8.5. In twin 2 the number of still birth was equally higher in those that were delivered vaginally than caesarean with a ratio of 5: 2. There was equally higher percentage of early neonatal death in both vaginally delivered twin 1 (9.4%) and twin 2 (11.9%) than those delivered by caesarean section, 3.8 and 3.5%, respectively. The percentage of new born admissions in twin 1 was higher in those delivered by caesarean section (39.6%) than those delivered vaginally (29.7%). There was almost equal rate of new born admission in vaginally and caesarean delivered twin 2, 33.9 and 34.5%, respectively.

Table 2: Indications for caesarean section

Characteristics	Total number	Frequency	Percent
Indications for caesarean			
Prolonged pregnancy	1	1	100
Placental praevia	2	1	50
Diabetes mellitus	3	3	100
Fetal distress	3	3	100
Retained second twin	6	5	83.3
Poor progress of labor	6	6	100
Previous caesarean section	6	4	66.7
Hypertension and its complications	17	13	76.4
Prematurity	48	1	2.1
Abnormal lies and presentations	48	15	31.5

Table 3: Mode of delivery and fetal outcome for twin 1

Neonatal characteristics/ outcome	Mode of delivery	
	Vaginal (*n*=64) (%)	Caesarean (*n*=53) (%) *P* value:OR (95% CI)
Fetal presentation		
Cephalic (*n*=73)	50 (78.1)	23 (43.4) 0.0002:4.7 (1.9-11)
Non cephalic (*n*=44)	14 (21.9)	30 (56.6) 0.0002:0.21 (.09-0.7)
Live status		
Live birth (*n*=107)	55 (85.9)	52 (98.1) 0.02:0.12 (0.01-1.0)
Still birth (*n*=10)	9 (14.1)	1 (1.9) 0.02:8.5 (1.4-19)
Early neonatal death (*n*=8)	6 (9.4)	2 (3.8) 0.21:2.6 (0.4-27)
New born admissions (*n*=40)	19 (29.7)	21 (39.6) 0.26:0.6 (0.6-1.4)
Five minute apgar score		
1-<7 (20)	11 (17.2)	9 (17.0) 0.98:1.0 (0.5-2.3)
7 and above (*n*=87)	44 (68.8)	43 (81.1) 0.13:0.51 (0.2-1.3)
Birth weight		
<2.5 kg (*n*=51)	33 (51.6)	19 (35.8) 0.09:1.9 (0.9-4.3)
2.5-<3.5 kg (*n*=52)	25 (39.1)	27 (50.9) 0.2:0.6 (0.3-1.4)
3.5 kg and above (*n*=13)	6 (9.4)	7 (13.2) 0.7:0.7 (0.2-2.5)

Table 5 shows maternal complications and the mode of delivery. Thirteen (19%) mothers that delivered by caesarean section had hypertension in pregnancy and or its complications, while only four of those that delivered vaginally had the same complication. The difference was statistically significant P-0.02, odd ratio 0.3. Post partum hemorrhage and anemia occurred more in mothers that were delivered vaginally than those delivered by caesarean section, the differences however were not statistically significant, P-0.5 and 0.29 respectively.

Discussion

The risks associated with multiple pregnancies remain great challenge to the obstetrician despite advancements in prenatal care. Its incidence has been increasing globally.[1]

Table 4: Mode of delivery and fetal outcome for twin 2

Neonatal characteristics/ outcome	Mode of delivery	
	Vaginal (*n*=59) (%)	Caesarean (*n*=58) (%) *P* value:OR (95% CI)
Fetal presentation		
Cephalic (*n*=70)	40 (67.8)	30 (51.7) 0.076:0.96 (.9-4.5)
Non cephalic (*n*=47)	19 (32.2)	28 (48.3) 0.076:0.5 (0.2-1.2)
Live status		
Live birth (*n*=110)	54 (91.5)	56 (96.5) 0.23:0.4 (0.05-2.4)
Still birth (*n*=7)	5 (8.5)	2 (3.5) 0.44:2.6 (0.4-28)
Early neonatal death (*n*=9)	7 (11.9)	2 (3.5) 0.08:3.8 (0.7-38)
New born admissions (*n*=42)	22 (33.9)	20 (34.5) 0.75:1.1 (0.5-2.6)
Five minute apgar score		
1-<7 (*n*=20)	12 (20.3)	8 (13.8) 0.49:1.6 (0.5-4.7)
7 and above (*n*=86)	40 (67.8)	46 (79.3) 0.23:0.6 (0.2-1.4)
Birth weight		
<2.5 kg (*n*=53)	27 (45.8)	26 (44.8) 0.93:1.0 (0.5-2.3)
2.5-<3.5 kg (*n*=55)	29 (49.2)	28 (48.3) 0.93:1.0 (0.5-2.3)
3.5 kg and above (*n*=4)	3 (5.1)	5 (8.6) 0.35:5.7 (0.1-2.9)

Table 5: Mode of delivery and maternal complications

Maternal complication	Mode of delivery		
	Vaginal (*n*=59) (%)	Caesarean (*n*=58) (%)	*P* value (OR: 95%CI)
Hypertension and complication	4 (6.8)	13 (19.0)	0.02 (0.3:0.08-0.83)
Post partum haemorrhage	7 (11.9)	4 (6.9)	0.5 (1.8:0.5-6.5)
Anemia	7 (11.9)	3 (5.2)	0.29 (2.5:0.6-10.1)
Puerperal fever	3 (5.1)	3 (5.2)	1.0 (1.0:0.9-5.1)
Diabetes mellitus	1 (1.7)	5 (8.6)	0.1 (0.2: 0.02-1.6)
Retained 2nd Twin	0 -	3 (5.2)	−1.0 (0.98:0.06-16.1)
Abruptio Placentae	3 (5.1)	0 -	1.0 (0.98:0.06-16.1)
Placentae praevia	1 (1.7)	1 (1.7)	
Retained placenta	1 (1.7)	1 (1.7)	

This has been attributed to increasing practice of assisted reproduction and delayed age of reproduction in carrier women. This global trend has not been the pattern in Nigeria.[6] The highest rate of multiple pregnancy was reported in western region of Nigeria.[3] More recent studies by Kuti *et al.* and Akinboro *et al.* showed varying but still high incidence of multiple pregnancies in the same region of Nigeria.[6,12] The twin incidence of 22 per 1000 deliveries recorded in this study was quite lower than that reported in the western part of Nigeria but closer to the rate of 28 per 1000 deliveries reported in Jos northern Nigeria and a study among Nigeria Igbo women.[4,13] The difference in regional prevalence of twin pregnancy may be explained by racial differences as the western region is predominantly Yorubas and Enugu in the east and Jos in the North are predominantly Igbos and Hausas, respectively. The mean age incidence of 30 ± 5 years reported in this study agreed with that reported by other researchers in the country.[4,6,14] The rate is lowest in women less than 24 years and more than 35 years.

A lot of factors such as gestational age, fetal presentation, and other associated maternal conditions are considered in deciding the optimal mode of delivery in twin pregnancy. It has been observed that caesarean section is more likely the mode of delivery in cases of twin pregnancy with gestational age and fetal presentation influencing the decision.[15] The global trend is that of reduction in caesarean rate. William *et al.* reported that 28.7% of women with twin pregnancy that are eligible for vaginal delivery still end up in caesarean delivery, they noted that successful vaginal delivery was more likely if the presentation of the second twin was vertex and if the birth weight discrepancy was less than 25%.[16] We found the overall caesarean rate of 48% in our institution with predominance among patient that received prenatal care. This showed an increased tendency among obstetrician in the region for abdominal delivery. Though this was comparably lower than 51.2% reported by Abasitti in Uyo southern Nigeria, and 69.7 and 64.9% caesarean section rate reported by Anna Dera *et al.* in their study of maternal outcome in twins in Poznan Poland.[17,18] Lower rate of caesarean section in twin mother of 27.5% was reported by Kuti O *et al.* in Ife western Nigeria.[13] Usta *et al.* reported that mothers of twins with leading twin cephalic delivered by caesarean had lower mean age, parity, and cervical dilatation compared to those that delivered vaginally.[19] This study found that vaginal delivery is most likely when the leading twin was cephalic and fetal weight between 1.5-2.1 kg in the absence of contraindications to vaginal delivery. Babies that weighed less than 1.5 kg were excluded because of increased low apgar score and neonatal mortality reported in this group of babies if delivered vaginally.[19]

The commonest indication for caesarean section in this study was malpresentation and hypertension in pregnancy. About 31% of those that had malpresentation which

were mostly breech presentation of the leading twin were delivered abdominally. Proper selection and offer of vaginally delivery for cases of twin pregnancy with leading twin breech may be of help in reducing the caesarean section rate. Recent studies have shown that there is no statistically significant difference in neonatal outcome in twin pregnancies with leading cephalic or breech when delivered vaginally in carefully selected cases.[20-24]

Preterm deliveries which complicate 41% of cases in this study continue to be the commonest complication of twin pregnancy. A rate of 41% was reported by Kuti *et al.* in Ile-Ife Nigeria with mean gestational age at delivery of 36.5 weeks.[13] Rates as high as 63% have been reported.[25] The mean delivery gestational age of 36.2 found in this study was comparable to, though slightly higher than, 35.9 weeks reported by Mazhar *et al.* in Parkstan and Anna Dera *et al.*[25,26] Other major complications reported in this study include hypertensive disorders, anemia, and obstetric hemorrhage. Caesarean section was the mode of delivery in most of twin pregnancies complicated by medical conditions such as hypertension and diabetes mellitus. Bolajoko noted in his study in South west Nigeria that multiple gestations are at increased risk of hypertensive disorders and caesarean delivery.[27] Anna Dera *et al.* reported no significant difference in the maternal morbidity in relation to mode of delivery, however greater number of mothers that had pregnancy induced hypertension was delivered by caesarean section.[25]

This study found a rather high overall perinatal mortality of 290/1000 live per births, this is higher than the overall perinatal mortality of 186/1000 reported by Aiseen *et al.* in their study in Jos Nigeria and 207 reported by Abasiatti *et al.* in Uyo Nigeria.[4,18] The perinatal outcome in our study was skewed by very high perinatal mortality of 463/1000 seen in neonate delivered by unbooked mothers. This poorer neonatal outcome in unbooked parturient corroborated the report by Aisen *et al.* in their study in Jos Nigeria.[4] This underscored the needs for program care in mothers with multiple pregnancies. Babara Luke *et al.*[28] reported in their study that program care in patients with multiple pregnancy (which involved dietician visits, additional maternal education, modification of maternal activity, individualized dietary prescription, multi-nutrient supplement, and monitoring of maternal nutrition) was associated with improved maternal and neonatal pregnancy outcome. We found a better perinatal outcome in babies delivered by caesarean section than those delivered vaginally both for first and second twins in terms of lesser number of still birth and early neonatal death. This corroborated study in twins by Aisean *et al.* in Jos Nigeria.[4] Smith *et al.*[29] in their studies in UK reported differing neonatal outcome depending on the gestational age at delivery. They noted that the odd ratio for death of second twin was higher in term twin that was delivered vaginally compared to those delivered by caesarean section. A similar publication led by the same author noted no association between birth order and neonatal outcome in twins delivered before 36 weeks gestation. It has been reported that gestational age at delivery, premature rupture of membranes, birth weight discordance, and 5 min Apgar score independently influence neonatal outcome.[24] Bats *et al.* and Roopnarinesingh *et al.*[22] reported no significant poor neonatal outcome in vaginal or caesarean delivery in twins with leading twin breech. Bats *et al.* however noted that careful protocol should be applied in determining the route of delivery.

This study was limited by the studied population size which was small and our inability to study in details the various factors that influence maternal and neonatal outcome in twins.

In this study perinatal mortality associated with twin deliveries in unbooked women was unacceptably high. The risks of still birth and early neonatal deaths were increased in leading twins following vaginal deliveries in unbooked mothers. Mother with medical morbidity such as hypertension and diabetes mellitus tend to be delivered by caesarean section. Caesarean deliveries in twin pregnancy have better neonatal outcome. Though our women prefers vaginal delivery, caesarean section has better neonatal outcome and should be the preferred method of delivery in twin pregnancy especially for patient that have had poor antenatal supervision and parturient with co-morbidities such as hypertension and diabetes mellitus. Cephalic presentation of the leading twin, birth weight less than 2.5 kg, and unbooked women presenting in advanced labor predisposed to vaginal delivery in twin pregnancies. Vaginal delivery should be offered to carefully selected patients.

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