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# Twin and Singleton Births in Ghana — A Case-control Study

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A retrospective study involving 623 twin and 1246 singleton births was conducted to compare the two groups with regard to selected maternal, fetal and labor and delivery characteristics and outcomes. Maternal age and parity were significantly higher for twins. The risks of preterm delivery, arrival in the labor ward in second stage of labor, cesarean births and postpartum haemorrhage were significantly higher in twin than in singleton births. In vaginal deliveries twin mothers were significantly less likely to have had episiotomies or perineal lacerations. There was no difference in the duration of the third stage of labor or in the incidence of retained placentae. Antepartum haemorrhage was a less likely indication for cesarean delivery among twins, while there was no significant difference in the likelihood of severe pre-eclampsia/eclampsia being an indication. Singleton babies were significantly heavier than twins. The incidences of malpresentation, low birth weight, stillbirths and of admission of live births to the neonatal intensive care unit were significantly higher in twins. There was no difference in the rate of instrumental vaginal delivery, or in the route of delivery of fetuses presenting by the breech. There is the need for detailed study of the incidences of antepartum haemorrhage and hypertensive diseases in twin and singleton pregnancies and of the factors determining the mode of delivery when such complications arise. Labor and delivery should also be examined to determine any differences between the two groups, especially in the first and second stages.

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Twin pregnancies have been described as being high-risk pregnancies because of the associated complications and unfavorable outcomes. There is increased risk of preterm labor and delivery, intrauterine growth restriction, low birth weight, congenital anomalies, and perinatal morbidity and mortality when compared to singleton pregnancies (Adinma & Agbai, 1994; Gardner et al., 1995; Okogbo & Familusi, 1997; Rydhstroem & Heraib, 2001; Spellacy et al., 1990). There is also increased incidence of maternal complications such as hypertensive disease and anaemia (Sibai et al., 2000; Spellacy et al., 1990). A greater likelihood of abruptio placentae, placenta praevia, premature labor and malpresentation increases the cesarean delivery rate, thus increasing the risks to the mother (Benanti et al., 1995).

Labor in twin pregnancies, compared to that in singleton pregnancies, has been reported to have a shorter duration of first stage with no difference in duration of second stage (Schiff et al., 1998). There is increased risk of post-partum haemorrhage in twin births, mainly due to uterine atony.

The aim of this study, conducted in the Korle Bu Teaching Hospital, was to compare twin and singleton births with regards to selected maternal, fetal and labor and delivery characteristics and outcomes. Korle Bu Teaching Hospital is the largest referral hospital in Ghana and is situated in the national capital, Accra. It serves as the site for clinical training of students of the University of Ghana Medical School. It is the policy in Ghana that twin labor and delivery should, as much as possible, be conducted in centers with facilities for performing cesarean section. Although there are a few other hospitals in Accra to which such patients may be referred most of them are sent to the Korle Bu Teaching Hospital. The fact of the presence of twin pregnancy is, in itself, sufficient reason to warrant referral to the Korle Bu Teaching Hospital. Gestational age is estimated on the basis of the last menstrual period, ultrasound scan or both, and most twins are diagnosed between late second trimester and early third trimester. It may be mentioned, however, that a study at the Korle Bu Teaching Hospital, covering the period January 1997 to December 1998, had revealed that about 22% of twins were undetected before delivery of the first twin (Obed, 2000).

## Materials and Methods

This was a retrospective study covering the 18-month period January to June 1999 and January to December 2000. The study was originally intended to cover the 2-year period January 1999 to December 2000. Unfortunately, the data sources for the second half of 1999 could not be traced and therefore only the first half of that year was included.

The data sources were the labor ward delivery record books. These were examined and all women delivered of twins were identified where at least one twin weighed 500 gms. For each such woman two women carrying singleton pregnancies were selected as controls: these were the women who had given birth just before and immediately after that particular twin delivery. For each woman the age and parity were noted. Gestational age at delivery (term or preterm), stage of labor on admission, fetal presentation, mode of delivery (and where there was cesarean delivery the indication), blood loss at delivery, whether episiotomy was

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performed and whether there were perineal lacerations, and duration of the third stage were recorded. Concerning the babies, information on birth weight, sex, admission to NICU (with indication for admission) and if stillborn the type of stillbirth were extracted.

The information was fed into and analysis was performed by personal computer using Epi-Info 6.04. Categorical variables were analysed using odds ratios (OR) with 95% Confidence Intervals (CI) and Chi-squared tests, and continuous variables were compared using student's *t* test. Differences were considered significant if  $p < 0.05$ .

## Results

During the period of study there were 630 twins delivered. There were incomplete data on five and these, together with one case of conjoint twins and one of abdominal pregnancy, were excluded from the analysis. Thus 623 twin and 1246 singleton births were compared.

The mean maternal age for twin births, 28.1 ( $SD = 5.4$ ) years, was significantly higher than that for singleton births, 27.4 ( $SD = 6.1$ ) years, ( $p = 0.014$ ). Similarly, the mean parity for twin births, 1.7 ( $SD = 1.6$ ) was significantly higher than that for singletons, 1.3 ( $SD = 1.6$ ), ( $p < 0.0001$ ).

### Labor and Delivery Characteristics and Maternal Outcomes

The risk of preterm delivery in twins was more than three times that for singletons. There was a 56% increased likelihood of women with twins arriving in the labor ward in second stage when compared with those carrying singletons (Table 1).

Women carrying twins were about one-and-a-half times more likely to be delivered by cesarean section than those carrying singletons (Table 1). This was due mainly to a significantly higher cesarean delivery rate in twin mothers delivered at term. 33.6% (159 out of 473) of twin mothers delivered at term had cesarean section while 22.6% (255 out of 1130) singleton mothers at term were so delivered, OR = 1.74 (95%CI 1.36–2.22),  $p < 0.0001$ . With regards to preterm deliveries there was no significant difference in the cesarean delivery rate between the two groups: 22% (33 out of 150) in twin and 23.3% (27 out of 116) in singleton mothers, OR = 0.93 (95%CI 0.50–1.73),  $p = 0.81$ .

Of the 192 twin mothers who had cesarean section, fourteen (7.3%) had the operation after vaginal delivery of the first twin.

In twin cesarean births the mean blood loss, 574 ( $SD = 266$ ) ml, was significantly higher than that in singleton cesarean births, 496 ( $SD = 244$ ) ml ( $p = 0.001$ ). The incidence of blood loss of 1000 ml or more in cesarean births was higher in twins than in singletons, although the difference was not statistically significant (Table 1). With regards to vaginal deliveries the mean blood loss in twin births, 352 ( $SD = 311$ ) ml, was again significantly higher than that in singleton births, 214 ( $SD = 140$ ),  $p < 0.0001$ , with a 95% confidence interval of mean difference in blood loss of 114.6–163.0 ml. In addition, twin vaginal births were at least four times more likely to be associated with blood loss of 500 ml or more than singleton vaginal births (Table 1).

In mothers delivered vaginally those carrying twins were significantly less likely to have had an episiotomy or perineal laceration than those carrying singletons. The likelihood of an episiotomy or perineal laceration in the twin mother was more

**Table 1**

Comparison of Labor and Delivery Characteristics and Maternal Outcomes

Parameter	No. Twin mothers	No. Singleton mothers	Odds ratio (95%CI)	<i>p</i>
Gestational age at delivery*				
Preterm	150(24.1%)	116(9.3%)	3.09 (2.35–4.06)	< 0.0001
Term	473(75.9%)	1130(90.7%)		
Arrival in 2nd Stage:				
Yes	83(13.3%)	112(9.0%)	1.56 (1.14–2.13)	0.004
No	540(86.7%)	1134(91.0%)		
Mode of delivery:				
Cesarean	192(30.8%)	282(22.6%)	1.52 (1.22–1.90)	0.00012
Vaginal	431(61.2%)	964(77.4%)		
Blood loss at delivery:				
Cesarean				
≥ 1000 ml	15(7.8%)	11(3.9%)	2.09 (0.88–4.99)	0.07
< 1000 ml	177(92.2%)	271(96.1%)		
Vaginal				
≥ 500 ml	69(16.0%)	41(4.3%)	4.28(2.80–6.55)	< 0.0001
< 500ml	362(84.0%)	923(95.7%)		
Episiotomy/ Perineal laceration:				
Yes	77(17.9%)	265(27.5%)	0.56 (0.43–0.77)	0.0001
No	354(82.1%)	699(72.5%)		
Manual removal of placenta:				
Yes	5(1.2%)	13(1.3%)	0.86 (0.24–2.59)	0.77
No	426(98.8%)	951(98.7%)		

Note: CI – Confidence Interval

\* Term was defined as at least 37 completed weeks of gestation, and preterm as less than 37 completed weeks.

**Table 2**

Comparison of Main Indications for Cesarean Section

Indication	No. Twin mothers	No. Singleton mothers	Odds Ratio (95%CI)	<i>p</i>
Footling breech	44(22.9%)	16(5.7%)	4.84(2.55–9.30)	< 0.0001
Antepartum/Intrapartum haemorrhage	6(3.1%)	25(8.9%)	0.33(0.11–0.85)	0.013
Fetal distress	13(6.8%)	39(13.8%)	0.45(0.22–0.91)	0.016
Severe Pre-eclampsia/ eclampsia	35(18.2%)	33(11.7%)	1.68(0.97–2.91)	0.063
Dystocia	30(15.6%)	89(31.6%)	0.40(0.25–0.65)	0.0009
Others	64(33.3%)	80(28.4%)		
Total	192(100%)	282(100%)		

Note: CI – Confidence Interval

**Table 3**

Comparison of Fetal Characteristics and Outcomes

Parameter	No. Twin babies	No. Singleton babies	Odds Ratio(95%CI)	<i>p</i>
<b>Presentation:</b>				
Non-vertex	287(23.0%)	88(7.1%)	3.94 (3.03–5.12)	< 0.0001
Vertex	959(77.0%)	1158(92.9%)		
<b>Sex ratios</b>				
Female	608(48.8%)	595(47.8%)	1.04 (0.89–1.22)	0.62
Male	638(51.2%)	651(52.2%)		
<b>Birth weight</b>				
< 2500 gms	604(48.5%)	173(13.9%)	5.84 (4.78–7.13)	< 0.0001
≥ 2500 gms	642(51.5%)	1073(86.1%)		
<b>Stillbirths</b>	93(7.5%)	62(5.0%)	1.54 (1.09–2.17)	0.01
<b>Livebirths</b>	1153(92.5%)	1184(95%)		
<b>NICU Admission:</b>				
Yes	256(22.2%)	141(11.9%)	2.11 (1.68–2.66)	< 0.0001
No	897(77.8%)	1043(88.1%)		

Note: CI – Confidence Interval

than forty per cent lower than that in the singleton mother (Table 1). In twin mothers 51 (11.8%) had episiotomies, 24 (5.6%) first degree perineal lacerations, and one (0.2%) each had second and third degree lacerations. Among singleton mothers there were 197 (20.4%) episiotomies, 65 (6.7%) first degree lacerations, two (0.2%) second degree lacerations and one (0.1%) third degree laceration.

The mean duration of the third stage, in vaginal deliveries, was not significantly different between the two groups, 8.3 (*SD* = 10.3) minutes for twins and 7.8 (*SD* = 11.8) minutes for singletons, (*p* = 0.45). There was also no difference in the incidence of retained placenta requiring manual removal between the two groups (Table 1).

Footling breech presentation was significantly a more likely indication for cesarean section in twins than in singletons while antepartum haemorrhage, fetal distress and dystocia were significantly less likely indications. There was no significant difference with regards to severe pre-eclampsia/eclampsia as an indication for cesarean section (Table 2).

#### Fetal Characteristics and Outcomes

Non-vertex presentation was almost four times more likely to occur in twins as they were to occur in singletons (Table 3). In singletons there were 69 (5.5%) breech

presentations, 14 (1.1%) in oblique/transverse lie and 5 (0.4%) face presentations. Concerning twins there were 268 (21.5%) breech presentations (170 first twins and 98 second twins), 19 (1.6%) in oblique/transverse lie and none with face presentation.

There was no significant difference in the rate of instrumental vaginal delivery (vacuum extraction) between the two groups: 12 twin babies and 21 singletons were delivered in that manner, OR = 0.57 (95%CI 0.26–1.21), *p* = 0.11. There was no significant difference, between twins and singletons, in the route of delivery of fetuses presenting by the breech: in twins 136 were delivered vaginally and 132 by cesarean section; the figures for singletons were 39 and 30 respectively, OR = 0.79 (95%CI 0.45–1.40), *p* = 0.39.

There was a non-significant increase in the proportion of females in twins compared to singletons (Table 3).

The mean birth weight of twins, 2350.2 (*SD* = 613.2) gms, was significantly lower than that of singletons, 3052.5 (*SD* = 638.0), *p* < 0.0001. The 95% confidence interval for the difference between the mean birth weights was 640.5–764.1 gms. The likelihood of a low birth weight infant among twins was almost six times as high as that among singletons (Table 3). On the other hand, the likelihood of babies of birth weight 3500 gms or more in

**Table 4**

Indications for NICU Admission

Indication	No. of Twins (% of twins admitted)	No. of Singletons (% of singletons admitted)
Low birth weight	160 (62.5%)	41 (29.1%)
Perinatal Asphyxia	94 (36.7%)	72 (51.1%)
Macrosomia (birth weight $\geq$ 4000 gm)	0 (0%)	21 (14.9%)
Others	2 (0.8%)	7 (4.9%)
Total	256 (100%)	141 (100%)

twins was only 4% of that in singletons: 19 (1.5%) of twin and 330 (26.5%) of singleton babies were in that category, OR = 0.04 (95%CI 0.03–0.07),  $p < 0.0001$ .

The fetal death rate in twins was more than one-and-a-half times that in singletons (Table 3). There were 49 (3.9%) macerated and 44 (3.5%) fresh stillbirths among twins; in singletons the figures were 33 (2.6%) and 29 (2.3%) respectively. In live-born infants the likelihood of admission to the NICU in twins was more than twice that in singletons (Table 3). The major indications for NICU admission of livebirths are shown in Table 4. The commonest indication in twins was low birth weight while asphyxia was the commonest in singletons. It must be pointed out, however, that the number of twin babies admitted on account of asphyxia was higher than that of singletons. It is hospital policy to admit all macrosomic babies (birth weight  $\geq$  4000 gms) to the NICU for observation. No twin was admitted on account of macrosomia.

## Discussion

The higher mean maternal age and parity in twins is consistent with what has been reported from Illinois, in the United States (Spellacy et al., 1990). A study in Ibadan, Nigeria, however, found no significant differences in age and parity between twin and singleton mothers, though twin mothers were older and of higher parity (Okogbo & Familusi, 1997).

The greater risk of preterm births among twins concurs with what has been reported in several studies (Adinma & Agbai, 1994; Gardner et al., 1995; Spellacy et al., 1990), although the three times increased risk in the present study is much lower than the more than five times increase reported in the above mentioned studies. It is not too clear why arrival in the labor ward in second stage is more common among twin mothers than in singleton mothers. It may be that twin first stage labor is shorter than that of singletons (Schiff et al., 1998) or that for some inexplicable reason women carrying twins delay in reporting to hospital when in labor. It is significant to note that there is no difference in the duration of the third stage of labor in twin and singleton vaginal births; it will be useful to determine if there are any differences in the characteristics of the other stages of labor between the two groups.

The greater blood loss associated with twin delivery, both abdominal and vaginal, is in line with the generally acknowledged increased blood loss associated with twin births. The higher incidence of postpartum haemorrhage in

twin vaginal delivery is due to the higher risk of associated uterine atony.

The higher cesarean delivery rate among twin mothers has been reported elsewhere (Adinma & Agbai, 1994; Doyle, 1996). The absence of any difference in the rate of cesarean births between twins and singletons delivered preterm is at variance with what has been reported from Israel, where the rate was significantly higher for twins (Mozrahi et al., 1999). Footling breech being a much more likely indication for cesarean section in twins than in singletons is a reflection of the greater incidence of malpresentation in the former.

In most studies, not only have singleton babies been reported to be bigger than twin babies but the incidence of low birth weight babies among twins has been reported to be several times higher than that in singletons (Okogbo & Familusi, 1997; Powers & Kiely, 1994; Spellacy et al., 1990). These findings have been confirmed in the present study. The greater likelihood of dystocia as an indication for cesarean delivery and the higher risk of having an episiotomy or perineal laceration in vaginal delivery, among singleton mothers, may be the result of singleton babies being much bigger than twins. Antepartum haemorrhage (especially due to placental abruption) and hypertensive disease in pregnancy are reported to be more common in twin than in singleton pregnancies (Ananth et al., 2001; Kovacs et al., 1989; Sibai et al., 2000; Spellacy et al., 1990). The greater likelihood of antepartum haemorrhage being an indication for cesarean delivery in singleton mothers and the absence of any significant difference, between the two groups, in the likelihood of severe pre-eclampsia being an indication for cesarean delivery require further enquiry. There is the need for a study into the incidences of the two complications in twin and singleton pregnancies and the factors influencing the route of delivery when such complications arise.

The higher incidence, among twins, of non-vertex presentation, stillbirths and of admission of live-born babies to the NICU has been reported in many studies (Adinma & Agbai, 1994; Campana & Roubicek, 1996; Kovacs et al., 1989; Okogbo & Familusi, 1997; Spellacy et al., 1990). The commonest indication for NICU admission of twins being low birth weight and that for singletons being perinatal asphyxia is consistent with what has been reported from Ibadan, Nigeria where the commonest morbidity factor among admissions to NICU were low birth weight and perinatal asphyxia for twins and singletons respectively (Okogbo & Familusi, 1997). It will be necessary to

determine the outcomes of NICU admissions so that it may be confirmed if any differences exist between twin and singleton babies, as has been reported in many studies that neonatal outcomes are much worse in twin babies (Campana & Roubicek, 1996; Powers & Kiely, 1994; Spellacy et al., 1990).

The absence of any difference in the rate of instrumental delivery between the two groups has also been reported from Nigeria (Adinma & Agbai, 1994).

In conclusion, most of the differences between twin and singleton births reported in other studies have been confirmed in this study. There is the need for detailed examination of the incidences of antepartum haemorrhage and hypertensive diseases in twin and singleton pregnancies and the factors determining the mode of delivery when such complications develop. Further studies of labor and delivery are also necessary to determine whether there are any differences, especially in the first and second stages, between twins and singletons.

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