Birth Weight Variation between the First and the Second Twin in Spontaneously Conceived Twin Pregnancies Delivered in Alex Ekwueme Federal University Teaching Hospital Abakaliki: A 5-year Retrospective Study

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Abstract

Background: Twin pregnancies are associated with disturbed fetal growth. Studies have shown reduced fetal growth, compared to singletons, and also differences in birth weight between first and second twin. Hence, there is a need to evaluate this outcome among twin pregnancies delivered in our hospital. Aim: To determine the birth weight variation between the first and second twin in spontaneously conceived twin pregnancies delivered at the Alex Ekwueme Federal University Teaching Hospital Abakaliki. Materials and Methods: This was a 5-year retrospective study undertaken between January 2012 and December 31 2016 at our hospital. The study cohorts were parturients who were delivered twin pregnancies that were spontaneously conceived. Data collection was done using a pre-designed proforma; analysis was done using SPSS version 20. Result: During the study period, there were 11,932 deliveries and 378 were spontaneously conceived twin deliveries. This accounted for 3.2% of all hospital deliveries. The peak age group for twin gestation was 21-34 years 319(84.4%), 262(69.3%) were booked. Primigravidae were 101 (26.7%) while multiparas were 207 (54.8%) and grandmultiparas; 70 (18.5%). Those delivered through caesarean section were 186 (49.2%) while 176(42.0%) were delivered through the vaginal route. The Apgar score for the first twin in the first and fifth minute respectively were good in 287(75.9%) while in the second twin, 260(68.8%) suffered no asphyxia. Males were more in the first, 211 (58.8%) as well as in the second twins 209(55.3%). The mean birth weight of the first twin was 2.39kg while the mean birth weight of the second twin was 2.36kg. The first twin therefore weighed heavier than the second twin by 30g. Conclusion: Birth weight between the first and the second twin can vary depending on the gestational age, the socio-demographic status and the sex of the fetuses.

Keywords: birth weight, variation, first twin, second twin, Abakaliki

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1. Introduction

Twin pregnancy is the development of two fetuses at the same time in a pregnancy [1]. Twin gestation can be of two types; monozygotic twins and dizygotic twins. Monozygotic twins occur in 1 in 250 births and are independent of race, heredity, age and parity. Dizygotic twinning however, is affected by each of these factors and also by use of fertility drugs. A woman who is a dizygotic twin is twice as likely to give birth to dizygotic twins [2]. They can be of different sexes or the same sex. In dizygotic twin, the two embryos have separate placenta and there is no communication between the fetal vessels of the two embryos. Their birth weight may vary or may be same while in monozygotic twins, they are more likely to be of the same weight compared to dizygotic twins [3].

The incidence of twin gestation has risen significantly over several decades, primarily due to increased use of fertility drugs for ovulation induction, superovulation, and assisted reproductive technologies (ART) such as in vitro fertilization [4]. Earlier and more precise sonography has revealed the incidence of multiple gestation to be
singleton birth; the other embryo is lost from bleeding, approximately 2/3rd of twin pregnancies end in a spontaneous disappearance ("vanishing twin") in over 20% of such cases, one or more of the discarding growth of the twin where there a difference in the intra pair weight depending on the mother and her current health. It has also been noted that there could be significant disparity in the birth weight of the twins as they are more likely to be complicated by symptoms like nausea and vomiting, heartburn, more severe pressure in the pelvis, backache, varicosities, constipation, haemorrhoid, abdominal distension, difficulty in breathing, ankle swelling due to higher levels of circulating hormones. They may also experience pregnancy complications like placenta previa, polyhydramnios, anaemia are also common in twin pregnancy, hypertensive disorders, gestational diabetes mellitus, anaemia, preterm birth, antepartum haemorrhage, postpartum haemorrhage, increase caesarean section rate and maternal and fetal death. Other complications associated with twin pregnancy include: discordant growth of the twins where there is a difference in growth rates between the twins. It could be grade 1 discordant growth which indicates a difference of 15-20% whereas grade 11 discordant growth, indicates a difference of >25% [7]. As a result of discordant growth, there can be discrepancy in the weight of the two twins and a discrepancy of 20% or more is usually considered to be significant [8].

2. Materials and Method

This was a 5 year retrospective study of birth weight variations in spontaneously conceived twin pregnancies between 1st January 2012 to 31st December, 2016 at the Obstetrics and Gynaecology department of the Alex Ekwueme Federal University Teaching Hospital, Abakaliki. The hospital is a tertiary hospital located at the centre of the state capital of Ebonyi State; the department runs gynaecological clinics, gynaecological emergency, antenatal, intrapartum, and postnatal services. It is also a referral centre for the surrounding maternities and hospitals and also receives referral from surrounding states; Cross Rivers, Enugu, and Benue states. Ebonyi state is one of five states in the south eastern geopolitical zones in Nigeria. The state consists of thirteen Local Government Areas, with each Local Government having a General Hospital and a few missionary hospitals. It has an estimated population of 2.1 million people and lie at between 7°3” N latitude and 5° 4” E longitude with a land mass approximately 5,932 square kilometers.

Information on the Biodata, gestational age, parity, mode of delivery, Apgar scores, birth weight of the first and second twins respectively, head circumference of the twins length of the twins and the placental weight were retrieved. Women who had incomplete data were excluded from the study. Data analysis was done using SPSS version 20. The results were expressed as frequency tables, percentages, mean and standard deviation. Associations between categorical data were analyzed using Chi square (X²), while continuous variables were analysed using the Student t test, with a p-value < 0.05 considered statistically significant. Ethical clearance was sought and obtained from the Health Research and Ethics committee of the Alex Ekwueme Federal University Teaching Hospital, Abakaliki.

3. Results

Over the study period, there were a total of 11,932 deliveries, 378 of them were spontaneously conceived twin deliveries. This gives an incidence of 3.2% of total deliveries in the study. The mean age was 28.87±4.70 years, modal age group 241 (63.8%) was 21-30 years. Majority 262(69.3%) were booked while 116 (30.7%) were unbooked. The incidence is more among multiparae 207 (54.8%), 373 (98.1%) were Christians while 234 (61.9%) lived in the urban area. (Table 1).

Table 2 represents the Obstetric parameters. Most of the twins were 279 (73.8%) delivered between 34 weeks and less than 40 weeks of gestation while 53(14.0%) delivered between 28 weeks and 34 weeks. Caesarean section was the route of delivery in 186(49.2%) while 190 (49.3%) were delivered by the vaginal route. Among them, vacuum was required in 14(3.7%) while 2(0.5%) had vaginal delivery for the first twin and caesarean section for the second twin.

At delivery 211 (55.8%) of the first twin were males while 167 (44.2) of the first twin were females. In the second twin 209 (55.3%) were males while 169 (44.7%) were females in the second twin. The male-male pair were
139 (36.8%) while the female-female pair were 97 (25.7%). The mixed sexes had 72 (19.0%) for male-female pair and 70 (18.5%) for female-male pair. The APGAR scores of the first twin, 287 (75.9%) showed no asphyxia, 53 (14.0%) showed moderate asphyxia while 22 (5.8%) had severe asphyxia and 16 (4.2%) had no life at all. Among the second twins, 260 (68.8%) of the babies had no asphyxia, 68 (18.0%) had moderate asphyxia while 32 (8.5%) had severe asphyxia and 18 (4.8%) had no life at all after delivery in the study (Table 3).

### Table 1. Socio-demographic characteristics of the study cohorts

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤20</td>
<td>13</td>
<td>3.4%</td>
</tr>
<tr>
<td>21-34</td>
<td>319</td>
<td>84.4%</td>
</tr>
<tr>
<td>≥35</td>
<td>46</td>
<td>12.2%</td>
</tr>
<tr>
<td>Booking status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booked</td>
<td>262</td>
<td>69.3%</td>
</tr>
<tr>
<td>Unbooked</td>
<td>116</td>
<td>30.7%</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>101</td>
<td>26.7%</td>
</tr>
<tr>
<td>1-4</td>
<td>207</td>
<td>54.8%</td>
</tr>
<tr>
<td>≥5</td>
<td>70</td>
<td>18.5%</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>373</td>
<td>98.7%</td>
</tr>
<tr>
<td>Muslim</td>
<td>4</td>
<td>1.1%</td>
</tr>
<tr>
<td>Traditional</td>
<td>1</td>
<td>0.2%</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>144</td>
<td>38.1%</td>
</tr>
<tr>
<td>Urban</td>
<td>234</td>
<td>61.9%</td>
</tr>
</tbody>
</table>

The total number of the first twin that weighed less than 2.5kg is 188 (49.7%) while 41 (10.8%) weighed 2.5kg and 149 (39.4%) weighed greater than 2.5kg. The number of the second twin than weighed less than 2.5kg is 187 (49.5%), 33 (8.7%) weighed 2.5kg while 158 (41.8%) weighed above 2.5kg.

### Table 3. Birth weight variation among twins at birth

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean birth weight (kg)</th>
<th>Mean birth weight (kg)</th>
<th>T Test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twin Pairs</td>
<td>First twin</td>
<td>Second twin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male-Male</td>
<td>2.36±0.65</td>
<td>2.32±0.64</td>
<td>0.5170</td>
<td>0.6056</td>
</tr>
<tr>
<td>Female-Female</td>
<td>2.36±0.56</td>
<td>3.35±0.51</td>
<td>0.1300</td>
<td>0.8967</td>
</tr>
<tr>
<td>Male-Female</td>
<td>2.41±0.60</td>
<td>2.20±0.60</td>
<td>2.1000</td>
<td>0.0375</td>
</tr>
<tr>
<td>Female-Male</td>
<td>2.48±0.41</td>
<td>2.62±0.45</td>
<td>1.9241</td>
<td>0.0564</td>
</tr>
<tr>
<td>Twin mean weight</td>
<td>2.39±0.57</td>
<td>2.36±0.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4 showed the Birth weight by Obstetrics parameters. The twins of the booked were found to be heavier than the unbooked with the first twin of the booked weighing 2.49±0.55 kg and second weighing 2.46±0.54 kg while in the unbooked, the first twin weighed 2.18±0.58 kg and the second weighed 2.15±0.62 kg. Those that delivered through the caesarean section was found to weigh heavier than those that delivered through the vaginal route. The first and second twins of those who delivered through the abdominal route weighed 2.5±0.48 kg while the first and the second twins of those who delivered through the vaginal route weighed 2.29±0.65 kg and 2.24±0.66 kg respectively. Nulliparae were found to deliver twins who were less than those delivered by primigravidae and multiparae.

### 4. Discussion

The incidence of twin delivery in this study was 3.2% of all deliveries which is similar to 3.1% found in other studies [6,23]. Mothers who are in the age range of 21 to 34 years gave to birth to twins more, 84.4% compared to women below or at 20 years, 3.4% and those at or above 35 years, 12.2%. The mean age for twin delivery in the study is 28.50 years. This is probable because it is the age group for greater reproductive potentials. This is in contrast to the study in Pakistan where older women gave birth to twins more than the younger ones [24].

Among the parturient, 69.3% were booked and the remainder came as unbooked. Women with twin gestation tend to book their pregnancy more due to the care required for twin delivery. Primigravidae were found to have higher incidence of twin gestation 26.7% more than other parity when evaluated individually but when combined, multipara had higher rate of rate of twins delivery than other parity; 54.8% while grandmultiparous women had lowest incidence for twin delivery; 18.5%. This contradicts the study done in Pakistan where older grandmultiparous women gave birth to twins more than the younger ones [24].

The number of the parturient who delivered twin that are Christian was 98.7% while the remainder were Muslim and traditionalist. This is because the study area was in a place where the predominant religion is Christianity and so majority of the population are Christians. Among the study population, 141(38.1%) lived in the rural area while 61.9% lived in the urban area. This might have influenced the booking status of the patient since the area under study was in urban area.

The mean gestational age at delivery of twin in this study was 36.2±1.4 weeks. Those that were born before 28 weeks were 2.4%, 14% were born preterm (28 weeks to <34 weeks). Twins are more likely to be born preterm due to the pressure of the combined weight on the cervix. This compares with the gestational age at delivery obtained in other studies [25,26]. Those that had their babies through the abdominal route were 49.2% while 46.6% had their delivery through the vaginal route. Among those remaining, 3.7% had their delivery through vacuum assisted vaginal delivery while 0.5% had vaginal delivery for the first twin and caesarean section for the second twin. Most that had abdominal route delivery were because of malpresentation of the first twin, cord prolapse or poor progress of labour while those that had both vaginal delivery and abdominal route combined was because of retained second twin.

Comparing the weight of the first and second twin, among those that weighed less than 1.5kg, 6.6% of the first twin weighed less than 1.5kg while 8.5% of the second twin weighed less than 1.5kg. This implies that the second twin weighed less in this category than the first twin. This is in keeping with the majority of studies that has been done15,29-33. For those that weighed between 1.5 and 2.5 kg, greater number of the first twin, 54.0% were in this category more than the second twin; 49.7%. The second twin weighed greater than the first twin at a weight greater than 2.5kg. At delivery 55.8% of the first twin were males while 44.2% of the first twin were females. In the second twin 55.3% were males while 44.7% were females in the second twin. The male-male pair was 36.2% and the female –female pair was 25.4%. The remainder was mixed sexes in the study. During the study period, male sex was higher in number than female sexes in the population.

The number of the first twin that had no asphyxia at birth was 75.9% while 69.3% of the second twin had no asphyxia. Moderate asphyxia was seen in 14% of the first twin and 18% of the second twin. Severe asphyxia and still birth were seen in 5.8% and 7.7%, 16(4.2%) and 19(5.0%) of the first and second twin respectively. This shows that more of the second twins had both moderate and severe asphyxia and also more of the second twin had still birth. This may also result from low birth weight associated with twin pregnancy and birth weight of the second twin as was recorded in other study done [26,27].

Comparing the twin pairs with the mean birth weight of the first and second twin, it shows that in male-male pair, the first male was 41.4g heavier than the second twin male. In female-female twin pair, the first twin female weighed 2.362kg while the second twin female weighed 2.356kg giving a mean difference of 5g. While in the mixed sexes, the first twin male in male-female mixture weighed 212g more than the second twin female in the pair and was 220g more than second twin male in female-male pair while the first twin female in female-male pair weighed 144g less
than the second twin male in the pair but was 288g heavier than the second twin female in the male-female twin pair. It was also observed that the male in mixed sex pairs weigh heavier than the males in same sex pair while the females in same sex pairs weigh heavier than the females in mixed sex pair. This demonstrates that sex pairs determine birth weight. This agrees with other studies that has been done [28,29,30]. The gender differences is generally believed to be the result of the effect of androgens on fetal growth. This gender differences in fetal growth is greater between the third trimester and less towards term, with males growing not only more, but earlier than females [31]. In this study however, these differences did not reach statistical significance except for the male-female pair.

Other researchers have demonstrated that females in unlike-gender pairs had higher birth weight than females in like-gender pairs. This is different from what was observed in the study. They found out that birth weight was only 20g heavier for boys and 6g heavier for girls in unlike-gender vs like-gender pairs [32,33,34].

From the study, primigravidae gave birth to twin whose weight were lighter than multipara and grandmultiparous University [34]. Booked patient were also found to give birth heavier than the mean of the second twin but this did not reach statistical significance. This is same with other study done in Vanderbutt University [34]. Booked patient were also found to give birth to twin who were heavier than the twins of the unbooked women. The first twin of the booked were 303g heavier than the first twin of the unbooked women and the second twin weighing 305g heavier than the second twin of the unbooked.

Those who were delivered through caesarea section weighed heavier than those delivered through the vaginal route and the difference is statistically significant. The mean birth weight of the first twin was 30g heavier than the mean of the second twin but this did not reach statistical significance. This is same with other study done in Abuja and in the Flemish population [33,34], but different from the study done in Port-Harcourt and Abuja [29,34].

5. Conclusion

In conclusion, birth weight between the first and the second twin can vary depending on the gestational age, the socio-demographic status of the patrurient and the sex of the fetuses.

Acknowledgements

None.

Conflict of Interest

There are no conflict of interest.

References


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