Original Research Article

Relationship between placenta weight and birth weight at the Federal Medical Centre, Yenagoa

INTRODUCTION

Undisputedly, the placenta and umbilical cord have been considered to fundamentally contribute to perinatal outcome. Unfortunately, robust reports on this in our setting are lacking. The objective of this study was to determine the relationship between the placenta weight and birth weight of the neonate at term pregnancy in a Tertiary Hospital in the Niger Delta. This was a cross sectional study of labour ward patients in the Obstetrics and Gynaecology Department of Federal Medical Centre, Yenagoa, Nigeria, conducted from 1st of April 2017 to the 1st of August 2017. Data on maternal age, parity, gestational age at delivery, mode of delivery, birth weight, freshly delivered untrimmed placental weight and birth weight were collected from four hundred and eighty-six (486) parturients who met the inclusion criteria and were recruited consecutively. The data was processed using SPSS windows version 22. P value < 0.05 was considered statistically significant. The mean age of respondents was 28.6 ± 5 years. The mean placenta weight was 543 g ± 79 and birth weight was 3096 g ± 600. The mean Placenta – Birth Weight Ratio (PBWR) was 17.5%. Placenta weight was positively correlated with birth weight (P<0.05). There was positive relationship between placenta weight and birth weight which was negligible notwithstanding. However, careful examination of the placenta and baby at birth is recommended.

Key words: Placenta weight, birth weight, placenta – birth weight ratio, perinatal outcome, Yenagoa.
comparable with vital body organs like the lung, kidney, heart and digestive organs for transfer of nutrients and gases from the mother to the fetus; removal of waste products from the fetus to the mother. Also, the placenta is a temporary endocrine organ that produces hormones for maintaining pregnancy (Kambale et al., 2016; Gupta et al., 2015; Susmita et al., 2015).

It is known that ‘placental size and its microvessels’ increase up to the end of the pregnancy as fetal requirements for nutrients increase with increase in gestational age (Lee et al., 2009; Žigic et al., 2010). Invariably, placenta insufficiency can influence normal development of the fetus negatively leading to low birth weight, premature infants, and increased perinatal morbidity and mortality (Barut et al., 2010; O’Brien et al., 2017).

The College of American Pathologists has long endorsed two standard references for biomedical purposes: absolute placental weight and fetal/placenta weight (F/P) ratio (Langston et al., 1997). Proper examination of the placenta can give a clue to the in–utero milieu of the fetus before birth. For instance, smaller placentae may be associated with trisomies, whereas larger ones may be associated with maternal diabetes mellitus. More so, disproportionately small placentas (high F/P ratio) may be seen in maternal hypertension and may cause fetal distress or low APGAR scores (Langston et al., 1997; Hadas et al., 2018). While disproportionately large ones (low F/P ratio) could be a reflection of acute placenta injury resulting in villous edema or a chronic process requiring placenta overgrowth, such as maternal anaemia or malnutrition (Langston et al., 1997; Hadas et al., 2018).

Furthermore, the capacity of the placenta to maintain and sustain adequate nutrient supply is commonly correlated to the birth weight (Tiruneh 2018, Güler et al., 2018; Patimah et al., 2015; Luque-Fernandez et al., 2015). Unfortunately, robust reports on this in our setting are lacking. Hence, paucity of literature on placenta weight and its relationship with birth weight of newborns in Nigeria, particularly the Niger Delta birthed this study.

**METHODOLOGY**

**Study design**

This was a cross sectional study of labour ward patients in the Obstetrics and Gynaecology Department of Federal Medical Centre, Yenagoa, Nigeria. It was conducted from 1st of April 2017 to the 1st of August 2017.

**Study area**

Bayelsa state is a Southern state of Nigeria in the core of the Niger Delta, between Rivers state and Delta state. Federal Medical Centre, Yenagoa is the only Federal Teaching institution in Bayelsa that provides all levels of health-care services to patients particularly from Bayelsa, Rivers and Delta States, including research and training.

**Study population**

This consisted of women in labour.

**Eligibility criteria**

Study population includes 486 pregnant women who presented with labour pain and were enrolled on admission to labour ward.

**Inclusion criteria**

Nulliparous patients with Gestational age 37 - 42 weeks (term), Spontaneous onset of labour, Singleton vertex presentation in active phase of labour (Cervical os dilatation of 4 cm) and acceptance to participate in the study after explanation.

**Exclusion criteria**

Multiparous parturients with gestational age < 37 or > 42 weeks (preterm or postterm), Multiple pregnancy, Induction of labour, Non-vertex presentation, pregnancy with obstetric complications, retained placenta, morbidly adherent placenta, Elective Caesarean Section cases and mothers who declined participating in the study.

**Sampling method**

Parturients who met the inclusion criteria were recruited consecutively. Labour was then monitored partographically, artificial rupture of membrane (ARM) done in active phase labour and oxytocin augmentation was used in cases with slow progress and inadequate uterine contractions. Vaginal delivery or Emergency Caesarean Section for poor progress in labour due to Cephalopelvic Disproportion was recorded as mode of delivery. These were the information obtained from this study population; maternal age, parity, gestational age at delivery (in weeks), mode of delivery, birth weight, freshly delivered untrimmed placental weight. The gestational age was estimated using last menstrual period (LMP) or done via ultrasound when the LMP was unknown. All placentae were weighed immediately after delivery on table top beam weighing scale together with the membranes and the cord after removing obvious blood clots. The placental-birth weight ratio (PBWR) was calculated as ratio of placental weight to neonatal weight and then multiplied by 100 (Panti et al., 2012). The weights of the neonates were recorded to the nearest gram as appropriate. Weight measurements were made by the nursing staff on duty or the attending resident using the same table top Beam weighing scale.

**Study instrument**

A structured self-administered questionnaire was designed.
and used to collect the said information from the patients.

Table 1. Birth weight

<table>
<thead>
<tr>
<th>BW (g)</th>
<th>Mean</th>
<th>SD</th>
<th>Range (Min-Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3096</td>
<td>600</td>
<td>4800 (400-5200)</td>
</tr>
</tbody>
</table>

Table 2. Placenta weight

<table>
<thead>
<tr>
<th>PW (g)</th>
<th>Mean</th>
<th>SD</th>
<th>Range (Min-Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>543</td>
<td>79</td>
<td>3300 (100-3400)</td>
</tr>
</tbody>
</table>

Table 3. Correlation between birth weight and placenta weight

<table>
<thead>
<tr>
<th>BW</th>
<th>PW</th>
<th>Test statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>g</td>
<td>0.01 Pearson’s (r)</td>
</tr>
</tbody>
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Data analysis

The data was processed using SPSS windows version 22. Two methods were used for analysis of data, descriptive and analytical. The descriptive statistics were done by examining the distribution of variables, while in the analytical statistics; t-test was performed for continuous variables, (Chi) square test used for categorical variables and the P value < 0.05 was considered statistically significant.

Ethical considerations

Approval for the study was obtained from the ethical committee of the Federal Medical Centre, Yenagoa. The study was carefully explained to the patients and their informed consent was obtained before recruiting them into the study.

RESULTS

The mean age of respondents was 28.6±5 years. The age of respondents ranged from 17 – 42 years. Majority 335 (68.9%) of mothers were educated to secondary school level, while 112 (23.0%) of the mothers had tertiary education; 36 (7.4%) had primary education; and only 3 (0.6%) had no education. Majority 482 (99.2%) of the respondents were Christians. Most 324 (66.7) of the respondents were from the Ijaw ethnic group; followed by the Igbo ethnic group 115 (23.7%). The mode of delivery was mostly by spontaneous vaginal delivery - 386 (79.4%). Statistically, maternal education and maternal age were both not found to significantly influence birth weight (p > 0.05). However, mode of delivery was found to significantly influenced by birth weight (p < 0.05). The mean Placenta – Birth Weight Ratio (PBWR) was 17.5%.

The Table 1 above shows a mean birth weight (BW) of 3096 g, standard deviation of 600 and range of 400-5200 g. The mean placenta weight (PW) of 543 g, standard deviation of 79 and range of 100-3400 g is shown in Table 2. Table 3 above shows a positive correlation of 0.01 between placenta weight (PW) and birth weight (BW).

DISCUSSION

The mean placenta weight of this study was 543 g which was in the normal category. This was similar to 565 g in South West Nigeria (Adetami et al., 2007) and 590 g in North West Nigeria (Panti et al., 2012), 587 g in Indonesia (Patimah et al., 2015) and 519 g in India (Manop et al., 2006). It was however much less than 630 g in South East Nigeria (Adinma and Agbai, 1995), 630 g in Western Europe (Barker et al., 1995), 670 g in North Central Nigeria (Onche et al., 2017) and 672 g reported in Norway (Strom-Roum et al., 2013). Contrarily, it was more than 477.6 g reported in Bayero University, Kano, Northern Nigeria (Anas and Saleh, 2014) and 470 g in Ukraine (Little et al., 2003). Variations in the technique of preparing and weighing the placenta, maternal nutritional status together with cord clamping time may be responsible for the different values reported in various studies.

The mean birth weight in this study was 3096 g. This was comparable with 3120 g in Ethiopia, 3103 g in the Afro-Caribbean region and 3140 g in India (Little et al., 2003; Tiruneh, 2018, Lurie et al., 1999; Sivarao et al., 2002). However, it was less than 3275 g in North West Nigeria, 3425 g, 3382 g, and 3400 g reported in Ukraine, Western Europe, and Eastern Nigeria respectively (Panti et al., 2012; Little et al., 2003; Barker et al., 1995; Adinma and Agbai, 1995), but Anas and Saleh reported a mean birth weight of 2867.4 g, which was lower than our finding (Anas and Saleh, 2014). Variations in genetics, maternal height, maternal weight, health status and nutrition may be responsible for the slight differences here and there among study populations.

The placenta – birth weight ratio is a reflection of the fetal and placental growth pattern (Tiruneh, 2018; Patimah et al., 2015, Güler et al a 2018, Luque-Fernandez et al. 2015). In this study, the mean PBWR was 17.5%. This was similar with 17.1% and 18.2% reported in Thailand and Sokoto (North West Nigeria). It was however higher than 13.9% in Ukraine but less than 19.5%, 20.0%, 20.3% and 20.4% respectively among aforementioned European, African (North Central Nigeria), Asian and Afro-Caribbean studies. Furthermore, there was a positive correlation of 0.01 between placenta and birth weight in our study, this signifies that as placenta weight is increasing, birth weight is also increasing. However, according to the rule of thumb, this correlation is negligible. This weak correlation was also reported by Panti et al., 2012 at the Usman Danfodiyo
University Teaching Hospital, Sokoto, Nigeria. Positive correlations have been documented in other studies (Tiruneh, 2018; Güler et al., 2018; Patimah et al., 2015; Luque-Fernandez et al., 2015).

The mean age of respondents was 28.6 ± 5 years with respondents ranging from 25 (17 – 42 years). This is also similar with documented study age group (Panti et al., 2012; Manop et al., 2006). Statistically, maternal education and maternal age were both found to significantly influence birth weight (p > 0.05). But, mode of delivery was found to be significantly influenced by birth weight. (p< 0.05).

**CONCLUSION**

There was positive relationship between placenta weight and birth weight which was negligible notwithstanding. However, careful examination of the placenta and baby at birth is recommended.

**Conflict of Interests**

The authors declare that there is no conflict of interests regarding the publication of the paper.

**REFERENCES**


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