The Proportion Of Low Birth Weight Babies Due To Small For Gestational Age (Sga) And Prematurity In Port Harcourt, South-South Nigeria - Changing Trends.

R Ugwu, A Eneh

Abstract
Background: Low birth weight (LBW), defined as a birth weight <2500g is basically due to prematurity or small for gestational age (SGA). These infants remain a significant public health problem in both developing and developed countries due to their significantly higher rates of morbidity and mortality. Aim: This study was undertaken to find out the proportion of LBW due to prematurity and SGA in Port Harcourt, South-South Nigeria. Study design: A retrospective chart analysis of babies admitted into the Special Care Baby Unit (SCBU) between January 2002 and December 2009. Results: There were a total of 7,191 admissions into the SCBU within the period with 1,941 (27%) being LBW. A total of 1,463 (75.4%) were preterm LBW while 478 (24.6%) were SGA. Within the same period, there were a total of 20,209 booked live deliveries in the hospital, of which 2,046 were low birth weight babies [preterm LBW 1314(64.2%); term LBW 732 (30.8%)] giving a LBW incidence of 10.1%. The differences in the mean age and height of mothers who delivered an SGA and preterm infant were not statistically significant (p = 0.3 and 0.5 respectively). When compared to mothers of normal weight babies, mothers of LBW babies were significantly younger (p = 0.01) and shorter (p = 0.0001). Identified predisposing factors in preterms were hypertensive disorders, multiple births, antepartum haemorrhages and preterm prelabour rupture of membranes while for SGA, factors identified were malaria in pregnancy, congenital abnormality, multiple gestation, and hypertensive disorders. Mortality was significantly higher in the low birth weight (p=0.000). Conclusion: There seems to be a changing trend in the cause of LBW in our region with prematurity accounting for the greater proportion as found in developed countries. Interventions to prevent the causes of preterm delivery will go a long way in reducing the incidence of LBW in the South - South region.

INTRODUCTION
Low birth weight (LBW), defined as a birth weight <2500 g, remains a significant public health problem in both developing and developed countries [1,2]. These infants experience greater neonatal morbidity and mortality and significantly higher rates of physical, neurological and mental handicaps later in life [1,3,4,5]. Low birth weight babies basically constitute 2 groups of babies - those born before 37 completed weeks (preterms) and those born after 37 completed weeks [small for gestational age (SGA)]. Babies who are born prematurely and who are also small for their gestational age have the worst prognosis [1]. The causes or mechanisms involved in LBW are different for premature infants and SGA infants, requiring different intervention for prevention. It is therefore important for this reason to understand the proportion of preterm LBW to term LBW babies in any LBW population.

Initial studies have shown that prematurity is responsible for LBW in developed countries and SGA in developing countries due to prevalent poverty and malnutrition [6,7]. This study is undertaken to find out if there is a changing trend in the proportion of LBW due to prematurity and SGA in south-south Nigeria, a developing country.

METHODS
A retrospective analysis of babies admitted into the Special Care Baby Unit (SCBU) between January 2002 and December 2009 (7 years) was carried out. The SCBU of University of Port Harcourt Teaching Hospital (UPTH) offers specialized care to ill neonates delivered in Port Harcourt and other neighboring south-south states. The SCBU report books and the patient case notes were reviewed. Information retrieved included gestational age (GA), birth weight, morbidity and mortality. The age of the mother, height, parity and any maternal medical illnesses
and obstetric complications were also noted. The maternal socioeconomic status was determined using the level of education attained and the occupation [8]. The GA documented was usually calculated from the first day of last menstrual period (LMP) of the mother. Where this is not available, the Dubowitz score[9] which is a method of clinical assessment in the newborn from birth until five days old using neurological and physical criteria was used to determine the gestational age. The Dubowitz score was also used to validate the reported GA and where there was a disparity in the reported GA and assessed GA, the assessed GA from the Dubowitz score was used as the GA. The results were analyzed using Epi Info version 6. Differences in the qualitative data were compared using the chi-square test and p-value less than 0.05 was considered as being statistically significant.

RESULTS

Within the period under review, there were a total of 7,191 admissions into the unit out of which 5,660 (78.7%) were term babies and 1,531 (21.3%) were preterm babies. Table I shows the birth weight categories of the admitted babies. The total number of LBW babies were 1,941 (27%) of which 1,463 (75.4%) were preterm LBW and 478 (24.6%) were term LBW. There were a total of 20,209 booked live deliveries in the hospital within the same period, of which 2,046 were low birth weight babies [preterm LBW 1314(64.2%); term LBW 732 (30.8%)] giving a LBW incidence of 10.1%.

Table II shows the characteristics of the LBW babies. One hundred and twenty-six (9%) of the preterm births were multiple births made up of 112 sets of twins, 11 sets of triplets and 3 sets of quadruplets. For the term LBW, there were 32 multiple births made up of 29 sets of twins and 3 sets of triplets. 140 sets of the multiple births were achieved spontaneously, 12 were through invitro fertilization (IVF) and 6 were through use of fertility drugs. There was no significant difference in the rate of multiple births between the preterm LBW and the term LBW (χ²=1.3; df = 1; p = 0.30). Seventy-four (15.5%) of the term LBW had major congenital abnormalities as against 21 (1.4%) of the preterms and this difference was statistically significant (χ² = 130; df =1; p = 0.0000). The major congenital abnormalities include intestinal obstruction (19), anterior abdominal wall defects (18), neural tube defects (14), ano-rectal anomalies (8), congenital heart defects (6), cleft lip/palate (5), limb deformities (4), bladder extrophy (3), chromosomal abnormalities (3) and multiple abnormalities (15).

Figure 1

Table I. Birth weight categories of all the babies that were admitted

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Term LBW(SGA)</th>
<th>Preterm LBW</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7191</td>
<td>100%</td>
</tr>
<tr>
<td>Term LGA(&gt;37weeks ≥4000g)</td>
<td>659</td>
<td>9.2%</td>
</tr>
<tr>
<td>Term NBW(&gt;37weeks;2500-3999g)</td>
<td>4523</td>
<td>62.9%</td>
</tr>
<tr>
<td>Term LBW(&gt;37weeks;2500g)</td>
<td>478</td>
<td>6.6%</td>
</tr>
<tr>
<td>Preterm NBW(&gt;37weeks;2500g)</td>
<td>68</td>
<td>0.9%</td>
</tr>
<tr>
<td>Preterm LBW(&gt;37weeks;1500-2499g)</td>
<td>874</td>
<td>12.2%</td>
</tr>
<tr>
<td>Preterm VLBW(&gt;37weeks;1000-1499g)</td>
<td>440</td>
<td>6.1%</td>
</tr>
<tr>
<td>Preterm ELBW(37weeks;500-999g)</td>
<td>149</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

(LGA = large for gestational age; NBW = normal birth weight; LBW = low birth weight; VLBW = very low birth weight; ELBW = extremely low birth weight)

Mortality was significantly higher in the LBW (χ² = 225.8; df=1;p = 0.0000), especially in those weighing between 500g-1499g. Table III shows the birth weight specific mortality. Most of the deaths were early neonatal deaths (deaths occurring within the first seven days of life). Compared to normal birth weight (NBW) babies, mortality increases with decreasing birth weight with the odds ratio (OR) being 1.7(95%CI; 1.4-1.9;p=0.000) for LBW, 7.7 (95% CI; 6.3-9.4; p=0.000) for VLBW and 118.8 (95%CI; 52.3-269.8; p=0.000) for ELBW. Morbidities were severe.
The proportion of low birth weight babies due to small for gestational age (SGA) and prematurity in Port Harcourt, South-South Nigeria - changing trends.

Birth asphyxia, overwhelming infections, severe neonatal jaundice, hypoglycemia and severe anemia and they also constituted the causes of mortality.

**Figure 3**
Table III. Birth weight specific mortality

<table>
<thead>
<tr>
<th>Birth weight</th>
<th>No. admitted</th>
<th>No. died</th>
<th>% of total admitted</th>
<th>% of total deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-999g</td>
<td>149</td>
<td>143</td>
<td>96.0</td>
<td>8.8</td>
</tr>
<tr>
<td>1000-1499g</td>
<td>440</td>
<td>257</td>
<td>69.7</td>
<td>16.4</td>
</tr>
<tr>
<td>1500-2499g</td>
<td>1332</td>
<td>337</td>
<td>25.0</td>
<td>20.8</td>
</tr>
<tr>
<td>2500-3999g</td>
<td>4591</td>
<td>830</td>
<td>18.0</td>
<td>51.1</td>
</tr>
<tr>
<td>≥4000g</td>
<td>659</td>
<td>47</td>
<td>7.1</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7191</strong></td>
<td><strong>1624</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

The mean age of mothers who delivered an SGA was 28.7±6.2 years and that of mothers who delivered a preterm baby was 28.1±5.2 years (Table IV). This difference was not statistically significant (p=0.3). The mean height of mothers who delivered an SGA was 159.5±4.2cm and that of mothers who delivered a preterm baby was 158.6±4.8cm. The difference was also not statistically significant (p>0.5).

When compared to mothers who delivered normal weight babies, mothers of LBW babies were significantly younger (p = 0.01) and shorter (p = 0.0001). Table V shows the parity and social class of the mothers. None of the mothers who delivered a preterm baby was greater than para 4. The mothers of 76% of SGA and 68.2% of preterm infants were in the middle (social class III) and lower social class (social class IV and V). This difference was not statistically significant ($\chi^2 = 1.86; p = 0.17$).

**Figure 4**
Table IV. The maternal age and height of LBW and Normal birth weight babies

Table VI shows the maternal medical/obstetric conditions. Major factors noted in mothers that delivered a preterm LBW include hypertensive disorders (32.1%), prelabour premature rupture of membranes (20.4%), malaria (20%) and antepartum haemorrhage (9.7%), whereas for SGA, major factors identified were malaria in pregnancy (46.9%) and hypertensive disorders (26.4%). Most mothers had more than one medical/obstetric complication.
The majority of low birthweight in developing countries were initially said to be due to intrauterine growth retardation [6,7]. This was collaborated by earlier studies [11,12]. In this study, the proportion of preterms among the low birth weight population was 75.4%. Other studies have also noted that majority of the LBW were mainly contributed by prematurity. In Enugu [10], 69.05% and in Plateau [16] 61% of the LBW were preterms. This denotes a changing trend from initial reports that suggest that LBW in developing countries are due predominantly to SGA.

Identified predisposing factors in SGA infants were congenital abnormality, malaria in pregnancy, multiple births and hypertensive disorders in pregnancy, whereas for preterm infants, multiple gestation, hypertensive disorders in pregnancy, preterm prelabour rupture of membranes /preterm labour, malaria and antepartum haemorrhage were the identified predisposing factors. This was similar to the finding in Enugu[10]. Dawodu and Letan[12] in their study noted that multiple pregnancy contributed equally to the delivery of preterm and growth-retarded infants which was a similar finding in this study. In other studies however multiple pregnancy did not play a significant role [16]. In multiple pregnancy, there is intrauterine growth restriction due to competition of the growing fetuses for limited nutrients as well as stretching of the uterus which can lead to preterm premature rupture of membrane, early labor and preterm delivery. It also increases obstetric complications like anemia, polyhydramnios and pregnancy induced hypertention [18]. Malaria which is endemic in our environment when it occurs in pregnancy can lead to placental insufficiency or maternal anemia both of which will impair foetal growth [19,20].

Babies with major birth defects are more likely be born prematurely or suffer intrauterine growth retardation as these structural abnormalities may limit normal development [1,21,22]. A major congenital abnormality was observed in 15.5% of those with SGA and 1.2% of the preterms. The other studies did not report a high prevalence of congenital abnormality as a predisposing factor to LBW. Compared to mothers that delivered a normal birth weight baby, mothers who delivered a LBW baby were significantly shorter and younger. This has also been observed in other studies [12] but was not significant in others [14].

Birthweight is an important predictor of infant survival. Infants born with a low birthweight tend to have extremely high rates of morbidity and mortality [1,3]. This was clearly
demonstrated in this study where the mortality among the ELBW population was above 90% whereas it was 18% for those infants weighing between 2500g and 3999g and 7.1% for those weighing greater than 4000g. Low birthweight is associated with impaired immune function which increases mortality from infectious diseases. Despite improvement in neonatal intensive care facilities in our centre over time, this high mortality did not differ much from an earlier study done in the same centre over two decades ago[17,23]. Preventing LBW may therefore be of more importance rather than improving the facilities for intensive care which often is beyond the reach of most families in developing countries.

CONCLUSION

Prematurity contributed over three-quarters of the LBW in south-south Nigeria. Reducing prematurity should now be our greatest challenge in order to reduce the incidence of LBW in our centre. Key interventions should therefore include proper management of those obstetric factors that increase the incidence of prematurity like pregnancy induced hypertension, antepartum haemorrhage, preterm premature rupture of membrane, cervical incompetence and multiple gestation as well as preventing and treating diseases such as malaria and HIV/AIDS.

References

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