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

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Citation

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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%.

Figure 1

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

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

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

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 (χ^2=1.3; df = 1; p = 0.30). Seventy-four (15.5%) of the term LBW had major congenital abnormality as against 21(1.4%) of the preterms and this difference was statistically significant (χ^2 = 130; df =1; p = 0.0000). The major congenital abnormalities include intestinal obstruction (19), anterior abdominal wall defects (18), neural tube defects (14), anorectal anomalies (8), congenital heart defects (6), cleft lip/palate (5), limb deformities (4), bladder exstrophy (3), chromosomal abnormalities (3) and multiple abnormalities (15).

Figure 2

Table II. Characteristics of the LBW babies that were admitted

Characteristics	Term LBW(SGA) No.(%)	Preterm LBW No.(%)
Total	478 (24.6%)	1463 (75.4%)
Male	235(49%)	689(47%)
Female	240(50%)	774(53%)
Indeterminate	3(1%)	0(0%)
Male:Female	1:1	1:1.1
Multiple births	32(7%)	126 (9%)
Congenital abnormality	74(15.5%)	21 (1.4%)
Inborn (booked)	148(31%)	685(47%)
Inborn (unbooked)	101(21%)	238(16%)
Outborn	229(48%)	540(37%)

Mortality was significantly higher in the LBW (χ^2 = 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

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

Birth weight	No. admitted	No. died	% of total admitted	% of total deaths
500-999g	149	143	96.0	8.8
1000-1499g	440	267	60.7	16.4
1500-2499g	1352	337	25.0	20.8
2500-3999g	4591	830	18.0	51.1
≥4000g	659	47	7.1	2.9
Total	**7191**	**1624**		**100**

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 (χ^2 = 1.86;p = 0.17).

Figure 4

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

Birth weight	Maternal age (mean±SD) years	Maternal height (mean±SD)cm
Preterm <2500g	28.1±5.2	158.6±4.8
Term <2500g	28.7±6.2	159.5±4.2
2500g -3999g	29.7±4.2	161.1±6.0
≥4000g	31.5±4.1	163.7±6.4

Figure 5

Table V. Parity and social class of the mothers of the LBW babies

	SGA. (%) n=478	Preterm n=1463
Parity		
1	158 (33%)	731 (50%)
2	129 (27%)	527 (36%)
3	72 (15%)	88 (6%)
4	76 (16%)	117 (8%)
5	14 (3%)	0 (0%)
≥5	29 (6%)	0 (0%)
Social Class		
I	38 (8%)	266 (18.2%)
II	76 (16%)	199 (13.6%)
III	192 (40%)	465 (31.8%)
IV	153 (32%)	400 (27.3%)
V	19 (4%)	133 (9.1%)

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.

Figure 6

Table VI. Maternal medical/obstetric complications

Maternal medical/obstetric complication	SGA. (%) n=478	Preterm n=1463
Malaria	224 (46.9%)	293 (20%)
Hypertensive Disorders	126 (26.4%)	469(32.1%)
Early/Premature rupture of membrane	13 (2.3%)	298 (20.4%)
Antepartum haemorrhage	11(2.3%)	142 (9.7%)
Polyhydramnios	38 (7.9%)	36 (2.5%)
Human Immunodeficiency Virus	27 (5.6%)	31 (2.1%)
Urinary Tract Infection	9 (1.9%)	59 (4%)
Cervical incompetence	3 (0.6%)	47 (3.2%)
Hepatitis	12 (2.5)	2 (0.1%)
Asthma	6 (1.3%)	5 (0.3%)
Uterine fibroid	7 (1.5%)	1 (0.1%)
Diabetes Mellitus	5 (1%)	9 (0.6%)
Chorioamnionitis	5 (1%)	12 (0.8%)
Sickle Cell Disease	2 (0.4%)	2 (0.1%)
Rhesus isoimmunization	2 (0.4%)	7 (0.5%)
Mental illness	1 (0.2%)	12 (0.8%)
Hyperthyroidism	1 (0.2%)	1 (0.1%)
Household violence	0 (0%)	8 (0.5%)
None	84 (17.6%)	204 (13.9%)

DISCUSSION

The incidence of LBW in this region was 10.1% which was similar to the incidence of 10.31% in Enugu (South East Nigeria), [10] but was lower than the 19.8% reported in Kano City (North West Nigeria) [11]. This may probably be due to very young age, early marriage, poor nutrition, anaemia and low socioeconomic status of the mothers observed in the Kano study. In South West Nigeria, the incidences ranged from 8.2% to 16.8% [12, 13, 14,15], while in Plateau (North Central Nigeria), the incidence was 12.2%[16]. These values are in keeping with the WHO estimates that the LBW levels in majority of sub-Saharan Africa fall between 10% and 20% [2].

The high rate of LBW of 27% of all admitted neonates into the unit during this period may probably be because the SCBU of University of Port Harcourt Teaching Hospital is a referral centre and offers specialized neonatal care and as such admits a lot of preterms and LBW babies who cannot be managed at a primary or secondary level of care. It was however lower than the 36.3% reported previously from the same centre [17].

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.

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