

## INCIDENCE AND OUTCOME OF LOW BIRTH WEIGHT NEONATES IN COMBINED MILITARY HOSPITAL CHITTAGONG

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### Abstract

**Introduction:** Incidence of low birth weight (LBW) neonates is high in the developing countries. In Bangladesh LBW accounts for one of the leading causes of less than 5 years children mortality. Long term follow up is required to reduce morbidity.

**Objectives:** To evaluate the incidence and outcome of low birth weight neonates in a hospital set up.

**Methods:** This prospective observational study was carried out on 67 low birth weight neonates admitted in the neonatal ICU of Combined Military Hospital (CMH) Chittagong over a period of one year. All the data was recorded in a questionnaire. Study group was regularly followed up to know outcome.

**Results:** Out of 282 total neonatal admissions 67 (23.76%) was LBW. Thirty eight (57.71%) were preterm and 29 (43.28%) were term but small for date. Male 37 (55.22%) predominated female 30 (44.77%). Thirty one (81.57%) of preterm and 21 (72.41%) of small for gestational age (SGA) neonates had normal growth & psychomotor

development. Out of 9 patients 3 (7.89%) of preterm & 6 (20.68%) of SGA neonates had developmental delay in various aspects of developmental milestones which was observed in the follow up period of this study. Four (5.97%) died in this study & one preterm neonates developed retinopathy of prematurity.

**Conclusion:** Early follow up can find out cases with developmental delay. Early intervention can reduce morbidity.

**Key-Words:** Low birth weight, Neonate, Preterm, Small for date, Developmental delay.

### Introduction

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2,500 grams (5.5 pounds) in first hour of delivery<sup>1</sup>. It is one of the most serious challenges in maternal and child health. LBW is closely associated with foetal and neonatal mortality and morbidity, inhibited growth and cognitive development as well as increased risks of chronic diseases later in life<sup>2</sup>.

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Many of them suffer from protein-energy malnutrition and infection<sup>2,3</sup>. Every year approximately 17 million infants in developing countries are born with LBW<sup>2</sup> and those who survive have little chance of fully reaching their growth potential. The latest regional estimates of LBW range from 25% in South Asia, where more than one-half of the world's LBW infants are born, to 10% and 12% in Sub-Saharan Africa and Latin America, respectively<sup>4</sup>.

According to WHO health statistics the prevalence of LBW (weight <2500 grams) in Bangladesh<sup>4,5</sup> was about 40% in 2005. LBW was regarded as one of the major targets of the Health for All (HFA) initiative and the Millennium Development Goals (MDGs).

The goal of reducing the incidence of LBW by at least one third between 2000 and 2010 is one of the major goals of the Declaration, 'A World Fit for Children', and the Plan of Action adopted at the United Nations General Assembly Special Session on Children<sup>6,7</sup> in 2002.

Low birth weight is due to prematurity, poor intrauterine growth (IUGR, also referred to as SGA), or both. Small for gestational age (SGA) refers to an infant whose birth weight was below the 10th percentile for the appropriate gestational age. Very low birth weight (VLBW) is a birth weight <1,500 gm, regardless of gestational age (although these babies are almost always premature).

According to World Health Organization Bulletin 2001, low birth weight approximately doubles the neonatal mortality rate in a periurban setting in Bangladesh and 84% of the neonatal deaths occurred in the first seven days; half of them within 48 hours<sup>8</sup>.

Preterm delivery is the most important contributor to the neonatal mortality rate (NMR). So, determination of gestational age and birth weight by various available methods like correct dating of menstrual period, early ultrasonography can be emphasized before any termination of pregnancy<sup>9</sup>.

There is increasing percentage of death in children <5 yrs of age that occurs in the neonatal period. Approximately 57% of the deaths in this group occur in the first month of life; of which 36% are attributable to premature births. In 2008, 8.2% of live born neonates in the USA weighed <2,500g. Over the past two decades, the LBW rate has increased primarily because of an increased number of preterm births. Approximately 30% of LBW infants in the USA have IUGR and are born after 37 weeks. In developing countries, approximately 70% of LBW infants have IUGR<sup>10</sup>.

Perinatal care has improved the rate of survival of VLBW infants when compared with term infants. VLBW neonates have a higher incidence of rehospitalization during the first year of life for sequelae of prematurity, infection, neurologic complications and psychosocial disorders.

### Materials and Methods

In this prospective observational study, all neonates with birth weight less than 2500g were selected from the neonates admitted to the neonatal unit in Combined Military Hospital (CMH) Chittagong for a period of one year from January to December 2011. These neonates were followed up for one year in the outpatient department

For the purpose of the study, inclusion criteria of a low birth weight neonate included birth weight less than 2.5 kg and gestational age more than 28 weeks. Exclusion criteria included age more than 28 days. LBW infants were grouped into three according to their birth weights. Group I consisted

of neonates with birth weight less than 1.5 kg, Group II consisted of neonates with birth weight from 1.5 kg to 2 kg and Group III consisted of neonates with birth weight from 2 kg to 2.5 kg. Gestational age of these three groups of neonates were also calculated. They were placed into two groups according to gestational age viz. group I contained preterm infants with gestational age of 28 to 37 weeks and group II contained term small for gestational age (SGA) with gestational age more than 37 weeks. Twenty eight weeks has been taken as the lower limit of gestational age as 28 weeks of gestation is taken as the age of viability in developing countries.

Special questionnaire included maternal and delivery data as well as data about low birth weight newborn. Gestational age was calculated using either the first day of last normal menstrual period or estimated by obstetric sonography and Dubowitz score. Data were collected, compiled and analyzed manually and presented in a tabular form.

Neonates were followed up for one year. Neonates got all the supportive and specific care from neonatal ICU. Minimum investigations like blood examination, chest x-ray, cranial ultrasonogram were done. When discharge criteria was fulfilled, patients were released with advice for regular follow-up up to one year.

## Results

Total low birth weight admission was 67 which constituted 23.76% of total neonatal admission (Table-I).

**Table-I:** Distribution of low birth weight neonates:

Total neonatal admission	Low birth weight	% of LBW
282	67	23.76

Z value 0.29 which is not significant.

Total cases were divided into three groups as shown in (Table-II).

**Table-II:** Distribution of LBW by birth weight (n=67):

Birth weight	<1.5 kg	1.5 to <2 kg	2 to <2.5 kg
Number	5	18	44
%	7.46	26.87	65.67

Proportion of preterm is higher than that of SGA among LBW (Z value=2.22) shown in Table-III.

**Table-III:** Distribution of LBW by gestational age (n=67)

Gestational age	Number	%
Preterm	38	56.72
Term (SGA)	29	43.28

Z value came 2.22

Males predominated over females (Table-IV).

**Table-IV:** Sex Distribution of LBW (n=67)

Sex	Number	%
Male	37	55.22
Female	30	44.78

The study demonstrated that among preterm group 8 (21.05%), 7(18.42%), 4(10.52%) developed neonatal sepsis, feeding problem, respiratory distress syndrome respectively. SGA group mainly developed perinatal asphyxia (Table-V).

**Table-V:** Distribution of LBW by disease pattern (n=67):

Disease	Preterm No (%)	Term (SGA) No (%)	Total no of Patients (%)
RDS	04(100%)	-	4 (5.97%)
Perinatal Asphyxia	02(20%)	08(80%)	10 (14.93%)
Neonatal Sepsis	08(80%)	02(20%)	10 (14.93%)
Hyperbilirubinaemia	05(83.33%)	01(16.67%)	06 (8.95%)
Feeding problem	07(77.78%)	2 (22.22%)	09 (13.43%)
Apnea	04(100%)	-	04 (5.97%)
Twin	06(60%)	04(40%)	10 (14.93%)
Congenital defects	01(25%)	03(75%)	4 (5.97%)
Miscellaneous problems	01(10%)	09(90%)	10 (14.93%)

Thirty one (81.57%) preterm and 21(72.41%) SGA had normal growth and psychomotor development (Table-VI).

**Table-VI:** Distribution of outcome (n=67)

Type	Preterm(%)	SGA(%)	Total(%)
Normal growth and psychomotor development	31(81.57)	21 (72.41)	52(77.6)
Developmental delay	03(7.89)	06 (20.68)	09(13.4)
Bronchopulmonary dysplasia and Retinopathy of Prematurity(ROP)	01(2.6)	-	01(1.5)
Death	03(7.89)	02 ( 6.89)	5(7.46)
<b>Total</b>	<b>38</b>	<b>29</b>	<b>67</b>

The outcome in regards to normal growth and psychomotor development between preterm and SGA was compared where X value was 0.693 which is insignificant (Table-VII).

**Table-VII:** Outcome in regards to normal growth and psychomotor development between preterm and SGA

Group	Normal Growth	Hampered Growth	Total
Preterm	31	07	38
SGA	21	08	29

X value came 0.693 which is insignificant.

Three preterm and 6 SGA neonates (X value=2.30) had developmental delay (Table-VIII).

**Table-VIII:** Outcome in regards to developmental delay in preterm and SGA (n=61)

Group	Developmental delay	Not delayed	Total
Preterm	03	35	38
SGA	06	23	29

X value came 2.30 which is insignificant.

One had Retinopathy of Prematurity (ROP) and 5(7%) neonates died (Table-VI). Mortality rate of study population was compared with that of national parameter (where X value was 12.21) which is highly significant that means mortality in study group is significantly lower as a result of hospital setting (Table-IX).

**Table-IX:** Mortality rate of study population and national parameter

Group	Alive	Dead	Total
Study	62	05	67
National Parameter	70	30	100

X<sup>2</sup> value came 12.21 which is highly significant.

There was no significant difference in the mortality rates between preterm and SGA (Table-X).

**Table-X:** Mortality rate among preterm and SGA

Group	Alive	Dead	Total
Preterm	35	03	38
SGA	27	02	29

X<sup>2</sup> value= 0.04 which is insignificant.

Developmental delay was noticed in various aspects of developmental milestones (Table-XI).

**Table-XI:** Distribution of LBW neonates according to developmental delay in the first one year (n=09)

Developmental Delay	Preterm		SGA	
	No.	%	No.	%
Motor and adaptive	-	-	01	
Cognition	01		02	
Social	01		01	-
Language and speech	01		02	

## Discussion

The incidence of LBW varies between regions, countries and also between areas between the same countries. According to UNICEF statistics, the global rate of LBW stands at 17%. Of these, 6% occur in industrialized countries and 21% in developing ones<sup>11</sup>. The incidence of LBW in our study in CMH Chittagong was 23.76%. But that rate in the Eastern Mediterranean region is 11%, and that in the Islamic Republic of Iran<sup>11</sup> is 10%. Of Them 5 (7.46%) of neonatal admissions were VLBW neonates. A finding that differs from the study reported in Italy<sup>12</sup>. In our study increased rate of LBW was found in preterm births which are consistent with that of other studies<sup>13</sup>. Male female ratio was approximately adjacent. 80% of small for date neonates of this study reported with perinatal asphyxia. All LBW neonates with RDS belonged to the preterm group. 10(14.93%) patients were twins. 79% LBW neonates ultimately achieved normal growth and development and 13% had developmental delay. National Institute of Health Conference propose definition for Bronchopulmonary Dysplasia (BPD), also known as chronic lung disease for infants born at <32 weeks gestation who remain in oxygen for the first 28 days, at 36 weeks Post-Menstrual Age (PMA) mild BPD is defined as no supplemental O<sub>2</sub> requirement, moderate BPD<sup>14</sup> is requirement of supplemental O<sub>2</sub> ≤30%, severe BPD is requirement of oxygen ≥30%. In our study, the lone case of

BPD was of severe variety later on developed Retinopathy of Prematurity (ROP).

In this study, the ROP case had birth weight of 1 kg, required 30 days admission in neonatal ICU, developed in the neonatal period. The incidence of ROP was 1.5% in this study unlike the study in Oman where the overall incidence of ROP<sup>15</sup> was 25.4% .

In our study, five multiple births was one of the reasons for LBW similar to the studies done in some cities in Iran<sup>16</sup>. In our study 30 (78.94%) preterm LBW were exposed to antenatal steroid treatment. As a result complications like intraventricular hemorrhage, NEC and PVL was nil. As in Bar-Lev MR's study<sup>17</sup>, they got satisfactory result with antenatal steroid treatment in preterm LBWs. Overall mortality in our study was 4 (5.97%) and all deaths occurred in the first week of delivery similar to Sabera Khatun's study<sup>18</sup>. Our study shows 94% survival rate at the end of 28 days which does not match with the study in Saudi Arabia<sup>19</sup>, probably due to lack of extreme LBW (<1kg) in our study.

Follow-up of development should be a continuous and flexible process of assessment of the child, including observation of the child during the medical consultation, giving due weight to the parents' opinion, A systematic neurological examination, evaluation of neuromotor development markers and screening tests such as, for example the Denver II test, to identify developmental disorders<sup>20</sup>.

During the first year of life, special attention should be given to preterms' motor progress, with assessments of passive tonus, posture, active mobility and muscular strength. Transitory neurological abnormalities involving posture, fine and gross motor control, coordination and balancerefexes and primarily dystonia (hypertonia or hypotonia) are detected in 40-80% of cases and disappear during the second year of life. A normal neuromotor examination during the second six ,

development, whilst persistent primitive patterns in terms of tonus, reflexes and posture may be transitory abnormalities or manifestations of cerebral palsy. For this reason diagnoses of cerebral palsy are more accurate during the second year of life, when transitory dystonia disappears<sup>21,22</sup>.

For diagnosing normal or abnormal development and evaluating the degree of abnormality, there are a number of different development scales which should be used for different age ranges. During the first years of life, the Bayley II and Griffiths scales quantify cognitive development, covering motor, adaptive, and personal-social and language domains. At the end of first year during follow-up, 9 (13.43%) cases had developmental delay in different parameters like Motor and adaptive Cognition Social Language and speech among whom 3 cases were preterm LBW and 6 were SGA. Long term outcome at the end of one year in different parameters observed in our study almost matched with Tina Gutbrod's<sup>23</sup> study.

### Conclusion

This study was conducted to identify the incidence and outcome of low birth weight neonates in a peripheral combined military hospital in Bangladesh. It identified that approximately quarter of the total admitted neonates had low birth weight and more than 50% were premature. With continuous advances in medical technology, more premature low birth weight babies are surviving. Unfortunately, even with the Intensive Neonatal Care, residual morbidities remain. The presence of short-term effects does not necessarily mean that there will be long-term effects, and, conversely, just because no short-term effects are evident does not mean there will be no long-term effects. This calls for long-term follow-up.

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