ORIGINAL STUDIES

Low Birth Weight and First Week Neonatal Mortality in a Tertiary Level Hospital in Bangladesh

[1]Sabera Khatun, [2]Fawzia Hossain, [3]Jannatul Ferdous, [4]Afroza Chowdhury

[1]Professor, Gyne Oncology, Department of Obstetrics and Gynecology, BSMMU, Dhaka, Bangladesh
[2]Assistant Professor, Department of Obstetrics and Gynecology, BSMMU, Dhaka, Bangladesh
[3]Assistant Professor, Department of Obstetrics and Gynecology, BSMMU, Dhaka, Bangladesh
[4]Medical Officer, Department of Obstetrics and Gynecology, BSMMU, Dhaka, Bangladesh

Abstract

Objectives: The incidence of low birth weight babies and the perinatal morbidity and mortality is inter-related. An understanding of the risk factors can help us to reduce their incidence and studying their management and outcome could help us to evolve optimal management strategies. The aim of the study was to find out the incidence of low birth weight and first week neonatal mortality rate.

Methods: The gestational age of the babies were determined and a comparison of the prenatal mortality ratio was done among vaginal and cesarean deliveries. During the study period all the patients irrespective of their gestational age admitted for delivery were recruited for the prospective analysis.. Their gestational age, mode of delivery, birth weight and outcome were collected in a preformed data-sheet.

Results: During the study period there were 2689 deliveries at BSMMU and among them 301 were low birth weight (LBW), rest were normal birth weight babies. Forty-eight from low birth weight and seven from normal birth weight babies died within first-week of delivery. The LBW babies were grouped in to three groups according to their birth weight, 1-1.5 kg = group one, 1.6-2 kg = group two, 2.1-2.4 kg = group three. It was found that 70% babies of group I, 40% of group II and 17% of group III were in the gestational age of 28-34 weeks. On the other hand 30% babies of group I, 60% of group II and 83% of group III were in the gestational age of 35-40 weeks. 79.36% of group I, 6.67% of group II and 0.63% of group III died within 7 days of birth.

Conclusion: Significant difference (p value < 0.001) was observed in first-week neonatal mortality among normal and low birth weight babies. Therefore, it can be concluded that birth weight and gestational age is an important determining factor for early neonatal death.

Keywords: Gestational age, low birth weight, first-week neonatal death, perinatal mortality.

INTRODUCTION

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 neonatal deaths occurred in the first seven days; half within 48 hours.[1] 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.[2]

Most common maternal medical complications requiring premature termination are uncontrolled diabetes, hypertension, renal disease, malignancies, systemic lupus erythematosus, severe infection and fever. More than 80% patients attending the obstetrics department are referred from other secondary or tertiary level centers of the country. There are some obstetric complications which also require premature termination. Most common condition worth mentioning here is the premature rupture of the membrane (PROM). Others are pre-eclampsia–eclampsia, antepartum hemorrhage, premature labor, history of one or two cesarean section with scar pain or weak scar.

Small for gestational age and intrauterine growth retarded babies are thus delivered prematurely before term. Small for gestational age is applied to all babies born with birth weight below 10th percentile of their gestational age without implying a pathologic restriction in their growth. But the term IUGR should be applied to fetuses affected by a pathologic restriction in their ability to grow. Diagnosis of IUGR is confirmed in neonatal period by finding of low ponderal index, low subcutaneous fat, hypoglycemia, hyperbilirubinemia, necrotizing enterocolitis, hyperviscosity syndrome. Neonatal course of IUGR is different from that of the baby that is small but healthy which rarely have significant problem. In a study done by Manara (1980) found that approximately 20% of all

stillborn infants show signs of growth retardation.[2] Another study done by Marrisol Olsen J: in 1985 found that IUGR was associated with and probably responsible for 26% of stillbirth among infants with birth weight less than 2500 gm.[3]

Incidence of low birth weight in our country is very high. WHO estimates globally 17% of all births are LBW, in developing country it is 19% whereas in developed country it is 7%.[4]

The study out come of the low birth weight babies within one week of delivery was done because most of the low birth weight in this hospital are unavoidable and proper management of these babies can improve neonatal survival.

METHODOLOGY

This is a prospective study done at the Obstetrics and Gynecology, Department of Bangabandhu Sheikh Mujib Medical University during the period from January 2001 to December 2002. All the patients irrespective of their gestational age, admitted for delivery were recruited. Weight of all alive babies delivered vaginally or by cesarean section was taken by birth scaler.

The babies were followed up for the first week of their life. Those requiring admission at the neonatology unit were transferred to that unit of our university. Very premature babies requiring special care baby unit facility were advised to get admission at special care baby unit (SCABU) of BIRDEM Hospital, Dhaka.

The babies who were discharged before one week of delivery were followed up at their home. Babies having birth weight below 2.5 kg were grouped in to three according to their birth weight. The babies having 1-1.5 kg birth weight were placed in group I, babies 1.6-2 kg birth weight were placed in group II, and those with 2.1-2.4 kg birth weight were placed in group III. Gestational age of these three groups of babies were also found out. They were placed into two groups according to gestational age. Before 34 weeks of pregnancy there is less chance of fetal lung maturity and in our country 28 weeks of gestation is taken as the age of viability. So 28-34 weeks of pregnancy were placed in early viable age of gestation and more than 34 weeks of pregnancy were placed in the late viable age group. Any error in gestational age was corrected by menstrual history and early ultrasonographic findings. Final gestational age were determined after delivery of the baby by external appearances, weight and behavior of the baby. Final outcome was determined within one week of delivery. Number of stillbirth and babies dying within first week of life among three groups were noted. Finally early neonatal deaths in relation to their gestational age among three groups were found out.

The variables were collected in a preformed data sheet. Variables collected were total number of delivery during January 2001 to December 2002, mode of delivery, total number of stillbirth and low birth weight babies delivered, gestational age among the LBW babies, death within first week among normal and LBW babies and prenatal death ratio among cesarean section and vaginal delivery group in our university were noted. Differences in early neonatal death among normal and low birth weight babies were statistically analyzed by X^2 test.

RESULTS

Table 1 shows the mode of delivery during the period 2001-2002.

Table 1: Mode of delivery during 2 year period (2001-2002)

Year	Total number of delivery	LUCS	Vaginal delivery	Instrumental delivery
2001	1395	829(59.42%)	558(40.00%)	8(1%)
2002	1314	772(58.75%)	530(40.00%)	12(1.5%)

Figure 1 shows 2689 deliveries during the study period. Among them, 301 (11%) were low birth weight babies.

Figure 2 shows the distribution of low birth weight babies in three groups. More than half (52.5%) of the babies were in group III which included babies with birth weight 2.1-2.5 kg, 29.9% babies were in group II. which included babies with birth weight 1.5-2 kg and 17.6% were group I, which included babies with birth weight 1.0-1.4 kg.

Figure 3 shows distribution of death among low birth-weight babies. 71.36% babies from group I, 6.67% from group II and 0.63% from group III died within 1 wk of delivery. So 99.39% babies weighing 2.1-2.5 kg, 93.33% babies weighing 1.5-2.0 kg and only 28.64% babies weighing 1-1.4 kg could be saved in
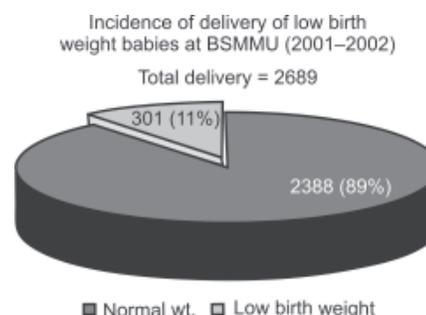

Fig. 1: Two thousand six hundred eighty-nine deliveries during the study period. Among them, 301(11%) were low birth weight babies
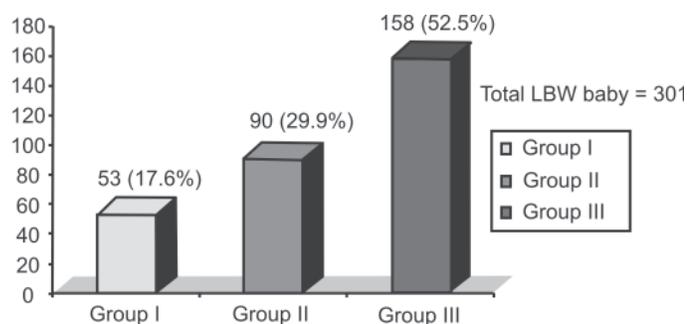
Fig. 2: Distribution of low birth weight babies among three groups (BSMMU 2001-2002)
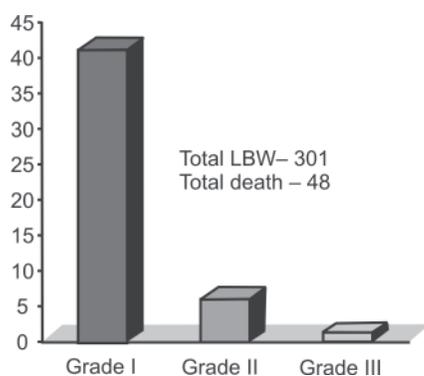

Fig. 3: Early neonatal death distribution among low birth weight babies (BSMMU 2001-2002)

Fig. 4: Gestational age distribution among low birth weight babies (BSMMU 2001-2002)

stillborn and 55 babies died within one week of their birth. So, there was 85 perinatal death and perinatal death ratio was 31.61/1000 birth which is much lower than that of our national figure. In the vaginal delivery group PMR was 45.95 / 1000 birth. In LUCS group there was 35 perinatal death and PMR was 21.86/1000 birth.

Table 3 shows the difference in early neonatal death between normal and low birth weight babies. The findings were statistically analysed by Chi-square test and the difference was found to be highly significant (P value <0.001).

DISCUSSION

By definition, a low birth weight baby is one which weighs less than 2500 gm at birth. The incidence of low birth weight varies between regions, countries and also within different areas of the same country. WHO estimated that about 17% of all births worldwide were low birth weight. The rate has shown only marginal decline over the years and the actual number is possibly increasing with the increase in number of births.

There were 2689 deliveries during the study period as showed in Figure 1. Among them 301 were low birth weight babies. So, the incidence of low birth weight babies at Bangabandhu Sheikh Mujib Medical University during the year 2001-2002 was 11%. In a study by N Nahar et al in 1994 and 1995 in three communities in Bangladesh, the incidence of low birth weight was found to be 24.8% .[4]

spite of low birth weight. Effective neonatal care is necessary to save the low birth weight babies

Figure 4 shows birth weight in relation to gestational age of the patients. Among early viable gestational age group (28-34 weeks) 69.81%, 40% and 17% babies were in group I, II and III respectively.

In late viable age group 82% were in group III, 61% in group II and 30% in group I. So it was found that the gestational age is directly related to the birth weight.

Table 2 shows perinatal mortality ratio. During the study period there was 2689 deliveries. Among them 30 babies were
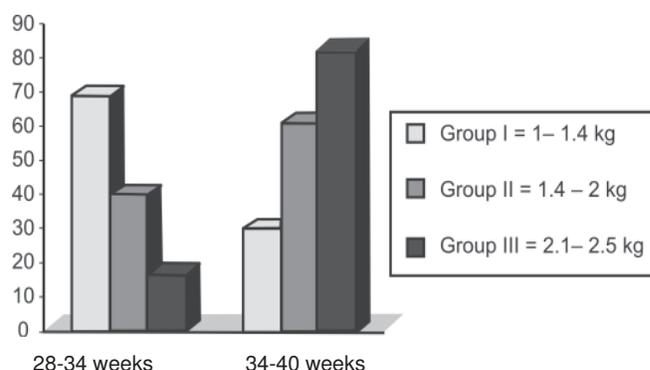
Table 2: Route of delivery related perinatal mortality ratio (2001-2002)

Route of delivery	Perinatal mortality still birth + death ≤ 1 week (30 + 55)	Perinatal mortality ratio (PMR)
Both route	Total – 85	31.61 / 1000 birth
LUCS	Total – 35	21.86 / 1000 birth
Vaginal delivery	Total – 50	45.95 / 1000 birth

Table 3: Birth weight related early neonatal death ($\leq$ 1 week)

Birth weight	Total number of death (N = 55)	Percent (100%)
$\geq$ 2.5 kg	7	12.72%
< 2.5 kg	48	87.27%

Figure 2 shows the distribution of low birth weight babies in three groups. More than 52.5% of the babies were in group III which included babies with birth weight 2.1-2.5 kg. 29.9% were in group II, which included babies with birth weight 1.5-2.0 kg. 17.6% were in group I, which included babies with birth weight 1.0-1.5 kg.

Figure 3 shows, among 53 babies, 42(79.36%) of group I, among 90 babies 6 (6.67%) of group II and among 158 babies 1(0.63%) of group III died within one week of delivery.

Among early viable gestational age group (28-34 weeks) 70, 40 and 17 percent babies were in group I, II and III respectively. Among late viable age group (34-40 weeks) 30, 60 and 83 percent were in group I, II and III respectively. Therefore it was found that the gestational age is directly related to the birth weight.

In this study, primary outcome was measured by perinatal death among vaginal delivery and cesarean section delivery groups. During the study period total perinatal death was 85. Among them 30 were still birth and 55 died within one week of delivery. In cesarean section group, total perinatal death was 35 and in vaginal delivery group it was 50. So, there was higher perinatal mortality ratio among vaginal delivery group (Table 2). Variation in death within one week of delivery was also observed among normal and low birth weight babies. Among the 55 babies dying within one week of delivery only 7 (12.72%) were of normal weight babies and 48(87.27%) were of low birth baby (Table 3). So statistically significant (p value <0.001) difference was found in early neonatal survivors among the normal and low birth weight babies (Table 4).

In South Asia, which accounts for more than one-third of the total births in the world, one in three newborns are underweight, which is more than four times the rate of developed countries. In Bangladesh. NMR is 42/1000 live births.[6] According to WHO Bulletin 2001 eighty four percent of neonatal deaths occurred in the first seven days; half within 48 hours.[1] More than half of the babies dying are low birth weight. Other important causes of neonatal deaths are infection, perinatal asphyxia or injury and prematurity. Preterm delivery is the commonest cause of delivery of low birth weight babies. In one study carried out in South Africa preterm labor was responsible for almost half of preterm deliveries and for 52% of all early neonatal death.[7]

In a study done by Dr Ferdousi Begum at Rajshahi Medical College Hospital it was found that 33% of perinatal deaths were from preterm birth and early neonatal death among preterm birth were 9 times higher than term births (p<0.001).[8] There is a wide variation in the occurrence of preterm labour among different ethnics and socioeconomic groups.

Another important cause of low birth weight baby is intrauterine growth retardation (IUGR) or small for gestational age (SGA) babies. These are the important causes of early neonatal death. One study done by Monara LR found that approximately 20% of all stillborn infants show signs of growth retardation[2] Another study found that IUGR was associated with and probably responsible for 26% of stillbirth among infants with a birth weight less than 2.5 kg.[3]

Fetal death in IUGR babies may occur at any time but is more frequent after 35 weeks of gestations.[9,10] So diagnosis of growth retardation before 35 weeks is very important from the oint of view of fetal and neonatal outcome.

Though premature babies have a higher risk of death during neonatal period, once they survive, they have a much better chance of physical and intellectual development compared to the growth retarded babies. Growth retarded babies on the other hand suffer from long-term physical and intellectual disability and their mortality in the long run is also higher. More over recent studies have shown that many of these babies are more prone to develop long-term degenerative diseases like diabetes mellitus and cardiovascular disease.

The third cause of low birth weight baby is delivery by induction of labor or by cesarean section due to some maternal and fetal complications. Based on these results, we can conclude that, before deciding termination of pregnancy vigorous investigation can be done to determine gestational age and weight of the baby. Every effort should be made to avoid iatrogenic prematurity.

REFERENCES

1. Bulletin World Health Organization 2001;79(7):608-14.
2. Manara LR. Intrapartum fetal morbidity and mortality in intrauterine growth-retarded infants. J Am Osteopath Assoc 1980;80:101.
3. Morrison I, Olsen J. Weight-specific stillbirths and associated causes of death: An analysis of 765 stillbirths. Am J Obstet Gynaecol 1985;152:975.
4. Nahar N, Afroza S, Hossain M. Incidence of low birth in three selected communities of Bangladesh. Bangladesh Med Res Coun Bul 1998;24(2):49-54l.
5. World Health Organization. Low Birth Weight. A tabulation of available. Information WHO/MCH 92.2. Geneva. World Health Organization, 1992.
6. Tejani N, Mann LI, Weiss RR. Antenatal diagnosis and management of the small for gestational age fetus. Obstet Gynecol 1976;47:31. The Perinatal Newsletter, Bangladesh 2002; 1(1).
7. Rush RW, Davey DA, Segal ML. The effect of preterm delivery on perinatal mortality. Br J Obstet Gynaecol 1978;85:806.
8. Usher RH. Clinical and therapeutic aspects of fetal malnutrition. Pediatr Clin North Am 1970;17:169.
9. Tejani N, Mann LI, Weiss RR. Antenatal diagnosis and management of the small-for-gestational age fetus. Obstet Gynaecol 1976;47:31.
10. Fernando Arias. Preterm labour. In Jane Danford-Shor, Gail Brower (Eds): Practical Guide to High-risk Pregnancy (2nd edn), Mosby Yearbook, Inc. USA 1997;(4): 72-73.