International Journal of Basic and Applied Medical Sciences ISSN: 2277-2103 (Online)
An Online International Journal Available at http://www.cibtech.org/jms.htm
2013 Vol. 3 (3) September-December, pp.39-43/Mukesh et al.
Research Article

OUTCOME IN LOW BIRTH WEIGHT NEWBORNS

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ABSTRACT
Objective was to determine the factors associated with outcome of low birth weight newborns. 300 consecutive LBW newborns were included in the study. All the LBW babies were defined according to standard definitions and were given management as per the standard protocol and they were followed up for a period of upto 30 days of life to study their morbidity and morality. Incidence of LBW was 26.8% in our study with mortality rate of 20%. Mortality rate was directly proportionate to low birth weight and lower gestational age with no survival in less than 1000gms babies. Major causes of neonatal morbidity was infection, sepsis and immaturity and majority of mortality occurred in the first 7 days of life and even in these initial 7 days, maximum number of deaths (46.8%) occurred during the first 3 days. The etiological factors and outcome for LBW newborns are not different from the factors which are associated with low birth weight for the last 3-4 decades. In addition to preventing the low birth weight newborns, we need to admit the LBW babies less than 2000 gms in NICU and caring rooming-in newborns who are between 2001-2500gms. Also to maintain adequate asepsis in the NICU, to use reliable screening tests for early diagnosis and prompt management and need to establish good level 3 care in teaching institutes and level 2 in district hospital with the emphasis on improvement in basic infrastructure rather than purchase of expensive ventilators.

Key Words: *Etiological Factors, Outcome of LBW*

INTRODUCTION
Low birth weight is an important cause of morbidity and mortality in infancy and neonatal period. World Health Organization (WHO) (1961) recommended that all infants weighing 2500gms or under be called as low birth weight (WHO, 1960). Previously all such infants were called premature. Many authors challenged this view, as some of the newborns weighing less than 2500gms were not premature. In fact, it was pointed out that in developing countries like India, majority of the deliveries resulting in babies weighing less than 2500gms were full term deliveries (Singh, 2004).
Now low birth weight is an accepted terminology for infants weighing 2500gms or less. It comprises premature as well as term small for gestational age babies (Nelson, 2003). Magnitude of the problem of low birth weight varies from place to place.

MATERIALS AND METHODS
The present study "Outcome in low birth weight newborns" has been carried out in the Department of Pediatrics, Shyam Shah Medical College and Associated Gandhi Memorial Hospital, Rewa, M.P. from May 2005 to August 2005. The present study was a hospital based.
A total of 300 consecutive newborns babies with birth weight 2500gms or less, born in the department were included in this study.
The delivery of all the babies were attended by a paediatrician well versed in the art of resuscitation. Record of Apgar score at 1, 5 and 10 minutes was made. Asphyxiated babies were managed in accordance with the action oriented protocol (Neonatal, 2004).
After resuscitation, the newborn babies were clinically examined to detect any congenital malformation. Gestational age of all the newborns was assessed clinically by New Ballard Score (Singh, 2004). Weight was recorded within one hour after birth in an electronic weighing machine which measures to an accuracy of ±5gms. Anthropometric measurements like length and head circumference were measured.

A detailed proforma was filled including details of antenatal, natal and postnatal period. Various factors like socio economic status according to modified Kuppuswamy socio-economic status scale (Mishra, 2003), the distance from the hospital, religion and residence whether rural or urban were enquired about in detail.

Details of antenatal history including maternal age, provision of antenatal care, tetanus toxoid, iron folic acid supplementation and maternal complaints like fever and premature rupture of membrane was asked for. Details of antenatal history from records of Department of Obstetric and Gynaecology with mode of delivery were noted.

The neonates were classified according to standard criteria. The babies admitted in nursery were reared in thermo neutral environment. All babies in NICU were observed round the clock by trained vigilant staff nurses and resident doctors. Routine nursery care and feeding was provided as per standard schedule. The treatment was provided to all cases as per standard protocols.

Babies in rooming-in-ward were seen every morning and evening by the paediatricians. They were exclusively breast fed. In the event of any complication, babies were transferred to NICU for the management.

All babies were examined daily and their overall morbidity and mortality during the hospital stay was recorded on a specially designed form.

Routine analysis of acid base status was not available during the study period. The infant was discharged when he/she was able to maintain his body temperature, was self feeding and showed steady weight gain.

These low birth weight babies were followed up to neonatal period (30 days) to study their morbidity and mortality. All data observed were tabulated and analysed statistically.

RESULTS AND DISCUSSION

Results

The incidence of low birth weight in our study was 26.8% and in terms of mortality pattern there were 60 deaths out of 300 LBW i.e. 20% mortality rate. Death rate in males was 58.3% and in females was 41.6% i.e. there was more mortality in male low birth weight babies. In distribution of mortality according to weight was as follows: <1500 gms, there was 73.3% mortality whereas in low birth weight babies > 1500 gms, here was mortality of 17.2% only but in LBW < 1000 gms none survived (2/2).

In mortality pattern according to gestational age we observed that in ≤34 weeks mortality rate was 63% (38 out of 60) and in more than 34 weeks it was 37% (22 out of 60).

In the present study we have tried to correlate outcome of LBW according to weight and gestational age as shown in Table 1. There is decrease in neonatal mortality rate with increasing birth weight when gestational age is kept constant.

We also observed that majority of deaths occurred in babies of mothers of rural area (75%) with poor education. More mortality was observed when these two factors were associated with low socio economic status.

Multiple etiological factors were associated with mortality of LBW. The primary cause of death was observed – sepsis (46.6%), asphyxia (28.3%), meconium aspiration syndrome (6.6%), congenital anomalies (5.0%) and hyaline membrane disease (3.3%) and the secondary cause of death were shock (63.3%), apnea (38.3%), kernicterus (6.6%) and anaemia (8.3%).

In low birth weight babies of ≤1000gms 100% mortality was observed and these deaths were associated with 3 or more etiological factors.

In other weight groups also, majority of deaths were associated with >3 factors. Highly significant association was found between multiple etiological factors and mortality.

Majority of the deaths (86.6%) occurred in the first 7 days and even in these initial 7 days, maximum number of deaths (46.8%) occurred during the first 3 days.

Discussion

The results of the present study have shown that the mortality rate is 20%. The incidence of mortality by other authors were 14.4% by (Lubchenco, 1972), 14.3% by (Bhakoo *et al.,* 1975), 24.1% by (Panja, 1984), 26.4% by (Kumari *et al.,* 1989), 21% by (Das, 1993).

Distribution of mortality according to weight was in our study and in the literature is shown in Table 2. Mortality rate progressively decreased as the birth weight increased i.e. mortality is inversely related to birth weight which is highly significant.

In the present study, death rate below 1000gms was 100%. Rates in the same category reported by other authors are as: (Chaudhary, 1981) 100%; (Bhatia, 1984) 100%, (Tripathy, 2002) 100%, (Dayal, 1980) 100%, (Singh Meherban, 1982) 92% and (Lubchenco, 1972) 92%.

In mortality pattern according to gestational age we observed that in ≤34 weeks, mortality rate was 63% (38 out of 60) and in more than 34 weeks it was 37% (22 out of 60). Mortality was inversely related to gestational age which was highly significant (Meharban Singh, 1982; Tripathy, 2002; Mathur, 2000) also observed similar death rate.

Table 1: Observation

Weight (in gms)	**Gestational age**						
	≤ 28 weeks	**29-39 weeks**	**31-32 weeks**	**33-34 weeks**	**35-36 weeks**	**37-41 weeks**	**≥42 weeks**
2251-2500	-	-	-	23% (5/21)	19% (11/57)	4% (4/98)	-
2001-2250	-	-	0% (0/6)	28% (6/21)	25% (3/12)	12.5% (4/32)	0% (0/2)
1751-2000	-	100% (1/1)	50% (3/6)	28% (3/11)	0% (0/8)	0% (0/7)	-
1501-1750	-	100% (1/1)	73% (8/11)	0% (0/5)	0% (0/5)	0% (0/2)	-
1251-1500	-	100% (1/1)	75% (3/4)	50% (1/2)	0% (0/2)	-	-
1001-1250	-	100% (1/1)	100% (3/3)	-	-	-	-
750-1000	100% (2/2)			-	-	-	-

Neonatal mortality rate (in %)

Table 2: Previous work and reports

Authors	**500-1000 gm**	**1001-1500 gm**	**1501-2000**	**2001-2500 gm**
Bhatia (1984)	100%	74.4%	37.1%	7.6%
Singh (1985)	84.6%	54.3%	11%	1.9%
Lubchenco (1972)	92%	44%	14%	3%
Razia (2004)	66.6%	34.8%	19.4%	14.7%
Present study (2006)	100%	69%	28%	14.5%

Table 3: Previous database

Causes	Bhakoo (1975)[7]	Singh (1983-85)[15]	Bhatia (1984)[12]	NNPD* (1995)	Kaushik (1998)[20]	Narayan S (2003)[21]	Present study (2006)
Immaturity	16%	29.3%	11.4%	31%	17.8%	24%	15.1%
Infections	20.6%	26.8%	47.1%	22%	23.3%	41%	46.6%
Asphyxia	29.6%	20.1%	23.6%	26%	31.1%	25%	28.3%
Congenital malformation	9.7%	11.6%	7.3%	9.6%	1.4%	-	5%
Miscellaneous	14.1%	12.2%	10.6%	11.4%	9.6%	10.4%	5%

**National Neonatal Perinatal database*

Outcome according to weight and gestational age was correlated in our study. We found that there is decline in mortality rate with increasing gestational age when birth weight is constant. Gestational age and weight at birth can offer useful prediction of a possible anticipated outcome so that appropriate care is accorded to an individual newborn. So we analysed the neonatal mortality statistics based on birth weight and gestational maturity and gestational maturity and birth weight are most useful and easily quantifiable determinants. Similar results were also reported by (Yerushalmy, 1967; Lubchenco, 1972 and Meharban, 1982).

More mortality was observed in LBW babies in mothers of rural area. The probable reason being delayed seeking of medical care.

The primary causes of neonatal deaths as reported by various authors and our study are tabulated in Table 3.

In the present study, we also observed that majority of deaths (86.6%) occurred in the first 7 days of life and even in these initial 7 days, maximum number of deaths (46.8%) occurred during the first 3 days. Similar results were also reported by (Panja, 1984) (41.2%) and 36.0% by (Tripathi, 2002, Rao Shubha, 1970) observed that 81.7% of mortality occurred in initial 3 days.

Conclusion

In the present study we concluded that etiological factors and outcome are associated with low birth weight newborns are not different from the factors which were associated with low birth weight for the last 3-4 decades. Despite inputs from government and different NGOs for last 3-4 decades, we have not been able to modify these factors. Hence to prevent and save these low birth weight babies, the present study recommends the following:

* Good antenatal and natal care to prevent low birth weight newborns.
* Babies weighing less than 2000gms irrespective of their gestation age at birth should be accorded special care in the nursery.
* Newborn babies being 2001-2500gms should be closely observed in the lying-in-ward.
* Maintenance of adequate asepsis in the NICU and use of gamma-irradiated disposable feeding tubes, suction catheters, small vein infusion.
* Reliable screening tests for early diagnosis and prompt management.
* Need to establish good level 3 care in teaching institutes and level 2 in district hospital with the emphasis on improvement in basic infrastructure rather than purchase of expensive ventilators.

REFERENCES

Bhakoo ON (1975). Neonatal morbidity and mortality in hospital born babies. *Indian Pediatrics* **6** 443-6.
Bhatia ED (1984). Neonatal mortality pattern in rural based medical college hospital. *Indian Journal of Pediatrics* **51** 309-12.

Choudhary P (1981). A study of maternal and neonatal factors in relation to perinatal mortality. *Indian Pediatrics* **48** 297-304.
Das BK, Mishra RN, Mishra OP, Bhargava V and Prakash A (1993). Comparative outcome of low birth weight babies. *Indian Pediatrics* **30** 15-21.
Dayal RS (1980). Problems and management of low birth weight babies in an improvised neonatal unit of a developing country. *Bulletin International Pediatrics Association* **3** 36-46.
Kaushik SL, Parmar VR, Grover N and Kaushik R (1998). Neonatal mortality rate: relationship to birth weight and gestational age. *Indian Journal of Pediatrics* **65** 429-33.
Kumari S, Shendurnikar N, Jain S, Kanodia K, Jain R and Mullick DN (1989). Outcome of low birth weight babies with special reference to some maternal factors. *Indian Pediatrics* **26** 1063-4.
Lubchenco LO (1972). Neonatal mortality rate: relationship to birth weight and gestational age. *Journal of Pediatrics* **81** 814-22.
Mathur NB (2000). Neonatal morbidity and mortality in a referral neonatal unit. Presentation at the 37th National Conference of Indian Academy of Pediatrics, Jan. 27-30; Hyderabad, India.
Mishra D and Singh HP (2003). Kuppuswamy's socioeconomic status scale: a revision. *Indian Pediatrics* **70** 273-4.
Narayan S, Agrawal R, Upadhyay A, Deorari AK, Singh M and Paul VK (2003). Survival and morbidity in extremely low birth weight (ELBW) infants. *Indian Pediatrics* **40** 130-5.
Nelson (2003). Textbook of Pediatrics 17th edition.
Neonatal Advanced life support (2004). *National Neonatology Forum*.
Panja S, Bhattacharyya I and Das GM (1984). Low birth weight infants – study of mortality. *Indian Pediatrics* **21** 201-5.
Razia MV (1980). Morbidity and mortality patterns in hospitalized out born newborns and determinants of outcome. A thesis for M.D. (Paediatrics). APS University, Rewa (M.P.).
Shubha R (1970). Neonatal morbidity and mortality. *Indian Pediatrics* **7** 271-5.
Singh M (1982). Birth weight, gestational age correlation neonatal mortality. *Indian Paediatrics* **49** 511-7.
Singh M (2004). *Care of newborn* 6th edition New Delhi, Sagar Publications.
Tripathy R, Parida SN, Tripathy SN, Devi PS, Das RN and Swain A (2002). Physical status of newborn and neonatal outcome. *Indian Journal of Pediatrics* **69** 1041-5.
WHO Expert Committee (1960). *Report on Maturity and Child Health* **9**.
Yerushalmy J (1967). The classification of new born infants by birth weight and gestational age. *Journal of Pediatrics* **71** 164.