Original Research Article

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20202153

Magnitude, risk factors and outcome of low birth weight babies admitted to neonatal intensive care unit of a tertiary care centre in Puducherry, India

Maheswari K.*, Neha Sharma

Department of Pediatrics, Sri Venkateshwara Medical College Hospital and Research Centre, Puducherry, India

Received: 30 March 2020 Accepted: 22 April 2020

*Correspondence:

Dr. Maheswari K.,

E-mail: maheshwarikarunanidhi@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: This study was undertaken to know the magnitude, risk factors and outcome of LBW babies admitted in NICU in a tertiary centre.

Methods: This is a hospital based, retrospective study, of LBW babies admitted to NICU of Sri Venkateshwara Medical College hospital and research centre, Puducherry, from Jan 2019 - Dec 2019.

Results: About 340 babies were admitted to NICU and 56 were LBW babies, 5 were excluded and 51 LBW babies analysed. Magnitude of LBW babies, 51 (15%). Socio demographic pattern showed, IUGR (62.7%). Term IUGR (52%) and preterm IUGR (9.8%). Preterm babies (37.2%). Preterms <28 weeks of gestation (7.8%), 28-34 weeks (9.8%) and 34 to < 37 weeks (19.6%). LBW babies <1kg (7.8%), 1-1.5kg (1.9%) and 1.5 to 2.49 kg (90.1%). Male (52.9%), female babies (47%). LBW babies from rural area (62.7%), urban area (37.2%). Among the maternal risk factors, maternal anemia was common (31.3%). Elderly primi (13.7%), PROM and twin pregnancy in (9.8%) each, bad obstetric history (7.8%). PIH, APH, GDM and oligohydramnios in (3.9%) each. Rh negative pregnancy, grand multipara, teenage pregnancy, ART with hypothyroidism and unbooked pregnancy seen in (1.9%) each. Fetal distress (19.6%). Morbidity was (92.1%). Most common was jaundice (31.9%), sepsis (21.2%). Feeding difficulties (19.1%), TTNB (17%), apnea of prematurity (14.8%). Hypoglycemia and HIE in (12.7%) each. Hypothermia and HMD in (10.6%) each. Seizures in (8.5%) MAS and NEC (4.2%) each, congenital anomalies and hypocalcemia in (2.1%) and mortality in (7.8%). Extreme prematurity, ELBW with sepsis and RDS being common cause of mortality.

Conclusions: Iron tablets intake, nutritional care, regular antenatal checkup, spacing pregnancy, avoidance of teenage and elderly pregnancy is important. Improving the infrastructure, manpower in NICU to manage preterm babies, when surfactant and ventilation is given.

Keywords: LBW babies, Magnitude, Risk factors, Neonatal intensive care unit, Outcome

INTRODUCTION

The WHO has defined the term LBW as "the birth weight of a new born infants less than 2500 grams". There are some other categories also- very low birth weight babies, whose birth weight is less than 1500 grams and Extremely low birth weight babies whose birth weight is

less than 1000 grams. LBW is either the result of; preterm birth- that is a low gestational age at birth, commonly younger than 37 weeks of gestation. About 67% of all LBW babies are premature. Fetal growth restriction-These babies are called growth restricted or small for gestational age (SGA). These may be full term but they are underweight, may be small and have low

birth weight because of slow growth in uterus. Low birth weight is a major public health problem, particularly prevalent in developing countries. The highest incidence is 31% in South Asia. In India infants with birth weight of less than 2500 grams constitute about 33% of all live births. 1 Two thirds of SGA infants are born in Asia. 2 Low birth weight is one of the major determinants of perinatal survival, infant morbidity and mortality as well as the risk of developmental disabilities and illnesses in future lives.3 Half of all perinatal and one-third of all infant deaths are directly or indirectly related to LBW. Mortality of LBW babies is 40 times more than the normal weight babies. 4 Low birth weight might be caused by fetal, maternal or placental factors or a combination of risk factors, resulting in an impaired placental transport of nutrients or reduced growth potential of the fetus. Constitutional, gender and hereditary factors explain up to 40% of the variability of birth weight. Maternal age (<20 or >35), ethinicity, marital status, birth interval, educational level and socio-economic conditions are other explanatory factors. Common fetal factors are genetic and/or chromosomal aberrations. The risk factors for LBW during pregnancy are hypertensive disorders, diabetes, malnutrition, bleeding, anemia, infection, placental or fetal anomalies and multiple pregnancy.⁵ LBW is a multifactorial problem. Survival of newborns and long-term complications are highly correlated with birth weight.⁶ The hospital care of LBW babies requires massive expenses in terms of sophisticated equipment and trained personnel. Moreover, many LBW babies admitted to the intensive care units die from nosocomial infections.7 LBW babies who can survive in general will experience health problems and cognitive impairment. Cases of morbidity and mortality include infectious disease, stunted in childhood period and underweight are common in LBW babies.8 With the above background, this study was undertaken to determine the magnitude, risk factors and outcome of LBW babies to elaborate proper strategies to improve the survival of LBW babies.

METHODS

This is a hospital based, retrospective, descriptive study, in a tertiary care centre in Puducherry, south India. LBW babies admitted and treated in NICU in pediatric department from January 2019- December 2019 (12 months) in Sri venkateshwara medical college hospital and research center, Puducherry, were the participants. Newborns less than 2500 grams admitted to NICU with patient information, along investigation reports in the medical records were included in the study. LBW babies with incomplete information in medical records and newborns more than 2500 grams were excluded from the study. The patients needed for this study were identified by reviewing our confinement register in labour room and NICU nominal register. The hospital records of these patients admitted to NICU were retrieved from the medical records department following due permission. Out of 340 total admissions to NICU, 56 were LBW babies and 5 were excluded, since they did not fulfill the inclusion criteria. The remaining 51 LBW babies were analysed.

Quantitative variable is magnitude, risk factors and outcome pattern. Statistical analysis used was simple proportion test. The following data was collected from the medical records department (MRD) about the LBW babies included in this study-gender, gestational age, birth weight, address, provisional and final diagnosis of the patient, date of admission. Outcome was noted as discharge/left against medical advice/referred. History, examination details, Apgar score, Ballard score and investigations done were noted(CBC, CRP, serum bilirubin, chest x ray, USG abdomen, neuroimaging, EEG, ABG, CSF analysis, urine routine, microscopy, stool for occult blood, LFT,RFT). Course in the hospital and treatment given were recorded.

RESULTS

Out of the 340 newborns admitted to NICU, 56 were LBW babies and 5 were excluded, since they were not able to fulfill the inclusion criteria. Magnitude, Risk factors and Outcome of the remaining, 51 LBW babies were analysed. The magnitude of LBW babies being 51 (15%).

Table 1: Sociodemographic data of LBW babies admitted to NICU (n=51).

Data	Number	Percentage
Classification of LBW	51	100
IUGR	32	62.7
Term IUGR	27	52
Preterm IUGR	5	9.8
Preterm	19	37.2
<28 weeks of gestation	4	7.8
28-34 weeks of gestation	5	9.8
34 - <37 weeks of gestation	10	19.6
Birth weight	51	100
<1kg	4	7.8
1-1.5kg	1	1.9
1.5- 2.49 kg	46	90.1
Gender	51	100
Male	27	52.9
Female	24	47.0
Residence	51	100
Urban	19	37.2
Rural	32	62.7

According to the socio demographic pattern, our study showed that, among the 51 LBW babies IUGR were 32 (62.7%). Out of which term IUGR were 27 (52%) and preterm IUGR 5 (9.8%). Preterm babies were 19 (37.2%). Out of which preterms <28 weeks of gestation were 4 (7.8%), 28-34 weeks were 5 (9.8%), 34 to less than 37 weeks of gestation were 10 (19.6%). Distribution among birth weight showed that LBW babies less than 1kg were

4 (7.8%), 1 to 1.5kg being 1 (1.9%) and 1.5 to 2.49kg were 46 (90.1%). There was a male preponderance among LBW babies 27 (52.9%), female babies were 24 (47%). LBW babies from rural area were 32 (62.7%) and those from urban area being 19 (37.2%) (Table 1).

Risks factors for LBW were classified as maternal and fetal risk factors. Among the maternal risk factors the most common was maternal anemia 16 (31.3%). This was followed by elderly primi 7(13.7%), PROM and twin pregnancy in 5 (9.8%) each. Bad obstetric history was seen in 4 (7.8%). PIH, APH, GDM and oligohydramnios were seen in 2 (3.9%) each. The least common maternal risk factors were Rh negative pregnancy, grand multipara, teenage pregnancy, ART with hypothyroidism and unbooked pregnancy seen in 1 (1.9%) each. There was more than one risk factors in many mothers. Among the fetal risk factors, fetal distress was seen 10 (19.6%). There was more than one risk factors in many mothers (Table 2).

Table 2: Distribution of LBW babies in NICU according to risk factors (n=51).

Data	Number	Percentage
Maternal risk factors	41	80.3
Maternal anaemia	16	31.3
Elderly primi	7	13.7
PROM-Premature Rupture of Membranes	5	9.8
Twin pregnancy	5	9.8
Bad obstetric history	4	7.8
PIH - Pregnancy Induced Hypertension	2	3.9
APH-Antepartum hemorrhage	2	3.9
Oligohydramnios	2	3.9
GDM-Gestational Diabetes Mellitus	2	3.9
Rh negative pregnancy	1	1.9
Unbooked pregnancy	1	1.9
Teenage pregnancy	1	1.9
Grand multipara	1	1.9
ART with hypothyroidism	1	1.9
Foetal risk factors	10	19.6
Foetal distress	10	19.6

The outcome being, out of the 51 LBW babies admitted to NICU, the morbidity was seen in 47 (92.1%). The most common cause for morbidity was jaundice 15 (31.9%) and sepsis in 10 (21.2%). This was followed by feeding difficulties 9 (19.1), TTNB 8 (17), apnea of prematurity 7 (14.8%). Hypoglycemia and HIE was seen in 6 (12.7%) each. Hypothermia and HMD seen in 5 (10.6%) each. Seizures was seen in 4 (8.5%). The least noted morbidity pattern was MAS and NEC in 2 (4.2%) each, followed by congenital anomalies and hypocalcemia in 1 (2.1%). There was more than one morbidity factor in many LBW babies. Mortality pattern

was seen in 4 (7.8%) of LBW babies. Extreme prematurity, ELBW with sepsis and RDS (twins as a result of ART) was the cause of death in 2 (50%), followed by extreme prematurity, ELBW with RDS and septic shock in 1 (25%), extreme prematurity, ELBW with RDS, VAP and BPD in 1 (25%) (Table 3).

Table 3: Distribution of LBW babies admitted to NICU according to outcome (n=51).

Data	N (%)
Morbidity pattern	47 (92.1)
Jaundice	15 (31.9)
Sepsis	10 (21.2)
Feeding difficulties	9 (19.1)
TTNB- transient tachypnea of newborn	8 (17.0)
Apnea of prematurity	7 (14.8)
Hypoglycemia	6 (12.7)
HIE	6 (12.7)
Hypothermia	5 (10.6)
HMD - hyaline membrane disease	5 (10.6)
Seizures	4 (8.5)
MAS - Meconium aspiration syndrome	2 (4.2)
NEC- necrotizing enterocolitis	2 (4.2)
Congenital anomalies	1 (2.1)
Hypocalcemia	1 (2.1)
Mortality pattern	4 (7.8)
Extreme preterm, ELBW with sepsis and	2 (50)
RDS (twins as a result of ART)	
Extreme preterm, ELBW with RDS and septic shock	1 (25)
Extreme preterm, ELBW with RDS, VAP and BPD	1 (25)

DISCUSSION

Our study noted that, the magnitude of LBW babies being 51 (15%). In a study done by Bharati et al, it was seen that, in India nearly 20% of newborns have LBW.⁹

According to the socio demographic pattern, our study showed that, there was a male preponderance among LBW babies 27 (52.9%), female babies were 24 (47%). But in contrast a study done in malaysia showed female preponderance.9 Among the 51 LBW babies studied, IUGR were 32 (62.7%). Out of which, term IUGR were 27 (52%) and preterm IUGR 5 (9.8%). Preterm babies were less common 19 (37.2%). Out of which preterms <28 weeks of gestation were 4 (7.8%), 28-34 weeks were 5 (9.8%), 34 to less than 37 weeks of gestation were 10 (19.6%). Distribution among birth weight showed that LBW babies less than 1kg -ELBW were 4 (7.8%), 1 to 1.5kg being 1 (1.9%) and 1.5 to 2.49kg were 46 (90.1%). In contrast Nigerian study showed 90% of LBW babies were preterms. ELBW were (12%) and VLBW were (28.1%), showing slightly higher incidence compared to our study. 10 LBW babies from rural area were 32 (62.7%) and those from urban area being 19 (37.2%). Similar

results were seen in a study done in Assam which showed that in rural India, incidence of LBW babies are more than urban areas.¹¹

In our study, risks factors for LBW were classified as maternal and fetal risk factors. Among the maternal risk factors the most common was maternal anemia 16(31.3%). This was followed by elderly primi 7 (13.7%), PROM and twin pregnancy in 5 (9.8%) each, bad obstetric history 4 (7.8%). PIH, APH, GDM and oligohydramnios were seen in 2 (3.9%) each. The least common maternal risk factors were Rh negative pregnancy, grand multipara, teenage pregnancy, ART with hypothyroidism and unbooked pregnancy seen in 1 (1.9%) each. Among the fetal risk factors, fetal distress was seen 10 (19.6%). Our study noted maternal anaemia as the major maternal risk factor for LBW babies.

Similar findings were noted in the study done by Seema mishra in India, which revealed bad obstetric history, maternal anaemia, PIH, PROM as common maternal risk factors for LBW babies. ¹² A study done in Germany noted that the risk factors associated with IUGR were maternal toxemia, signs of fetal stress, premature labour and chorioamnionitis. ¹³ Maternal parity was seen as a factor associated with poor outcome in very low birth weight babies. ¹⁴ Maternal anaemia is a major contributor of adverse neonatal outcomes, particularly compromised birth weight and head circumference. ¹⁵ Rates of preterm births were higher among older mothers. ¹⁶ Various studies have reported that children born to women who conceived with ART, were premature and of LBW and there is higher propensity of multiple pregnancies. ¹⁷

The outcome being, out of the 51 LBW babies admitted to NICU, the morbidity was seen in 47 (92.1%). The most common cause for morbidity noted in our study was jaundice 15 (31.9%) and sepsis 10 (21.2%). This was followed by feeding difficulties 9 (19.1), TTNB 8 (17), apnea of prematurity 7 (14.8%). Hypoglycemia and HIE was seen in 6 (12.7%) each. Hypothermia and HMD seen in 5 (10.6%) each. Seizures was seen in 4 (8.5%). The least noted morbidity pattern was MAS and NEC in 2 (4.2%) each, followed by congenital anomalies and hypocalcemia in 1 (2.1%). In a study conducted in Nigeria, it was seen that the most common cause of morbidity in LBW was sepsis (46%), recurrent apnea (32%), birth asphyxia (21%) and jaundice (19%), congenital malformations (4%), MAS(0.8%). 10.6

Mortality pattern was seen in 4 (7.8%) of LBW babies. Our study noted that extreme prematurity, ELBW, RDS and sepsis as the most common cause of mortality. Similarly, survival analysis showed that ELBW& VLBW babies were respectively about 20 and 4 times more likely to die relative to LBW. A study done in Cuttack, India showed that RDS formed 13.5% of all neonatal deaths. It affects 60-80% of babies born before 28 weeks, 50% of those born between 28-32 weeks. 10.18 The

extremely premature infants and ELBW remain at high risk for death and disability with 30 to 50% mortality.¹⁹

CONCLUSION

Being a multifactorial problem, integrated approach should be followed to reduce the magnitude, morbidity and mortality related to LBW. Intake of iron tablets, provision of proper diet and nutritional care of mothers during pregnancy is essential and has a significant role in reducing the prevalence of LBW babies. Regular antenatal checkup, good spacing of pregnancy, family planning, avoidance of teenage and elderly pregnancy through health education is important.

Screening of intrauterine infection and administration of antenatal steroids when needed is important. Awareness of newer etiology of LBW like, Artificial Reproductive Technique-ART is essential for proper management. Improving the infrastructure and manpower in NICU to manage preterm babies, when surfactant and ventilation is a priority, goes a long way in improving their survival.

ACKNOWLEDGEMENTS

Authors would like to thank all the NICU and MRD staffs, for helping us in collection of patient information.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- Sharma M, Mishra S. Maternal risk factors and consequences of low birth weight in Infants. IOSR J Humanities Social Sci. 2013 Jul-Aug;13(4):39-45.
- Lee AC, Katz J, Blencowe H, Cousens S, Kozuki N, Vogel JP, et al. National and regional estimates of term and preterm babies born small for gestational age in 138 low-income and middle-income countries in 2010. Lancet Glob Health. 2013Jul;1(1):e26-36.
- 3. Louis B, Steven B, Margret N, Ronald N, Emmanuel L, Tadeo N, et al. Prevalence and Factors Associated with Low Birth Weight among Teenage Mothers in New Mulago Hospital: A Cross Sectional Study. J Health Sci (El Monte). 2016;4:192-9.
- Gebregzabiherher Y, Haftu A, Weldemariam S, Gebrehiwet H. The Prevalence and Risk Factors for Low Birth Weight among Term Newborns in Adwa General Hospital, Northern Ethiopia. Obstet Gynecol Int. 2017;2149156:1-7.
- 5. Singh G, Chouhan R, Sidhu K. Maternal Factors for Low Birth Weight Babies. Med J Armed Forces India. 2009 Jan;65(1):10-2.
- Mekie M, Taklual W. Magnitude of low birth weight and maternal risk factors among women who delivered in Debre Tabor Hospital, Amhara Region,

- Ethiopia: a facility based cross- sectional study. Italian J Pediatr. 2019 Jul;45(86):1-6.
- 7. Das BK, Mishra RN, Mishra OP, Bhargava V, Prakash A. Comparative Outcome of Low Birth Weight Babies. Indian Pediatr. 1993;30(1):15-21.
- 8. Siramaneerat I, Agushybana F, Meebunmak Y. Maternal Risk Factors Associated with Low Birth Weight in Indonesia. Open Public Health J. 2018;11:376-83.
- 9. Bharati P, Pal M, Bandyopadhyay M, Bhakta A, Chakraborty S. Prevalence and Causes of Low Birth Weight in India. Malaysian J Nutr. 2011;17(3):301-13.
- 10. Chidiebere ODI, Uchenna E, Ikenna KN, Christian I, Nwabueze AI, Ogechukwu FA. The Low-birth weight Infants: Pattern of Morbidity and Mortality in a tertiary Health care Facility in the South Eastern Nigeria. Ann Med Health Sci Res. 2018;8:4-10.
- 11. Borah M, Baruah R. Morbidity status of low birth weight babies in rural areas of Assam: A prospective longitudinal study. J Family Med Prim Care. 2015Jul-Sep;4(3):380-3.
- 12. Mishra S, Joshi M. Low birth weight babies- risk factors and complications: a clinical study. Inter J Contempor Med Res. 2017;4(1):149-50.
- 13. Veelken N, Stollhoff K, Claussen M. Development and perinatal risk factors of very low-birth-weight infants. Small versus appropriate for gestational age. Neuropediatr. 1992; 23(2):102-7.
- 14. Ballot DE, Potterton J, Chirwa T, Hilburn N, Cooper PA. Developmental outcome of very low

- birth weight infants in a developing country. BMC Pediatr. 2012 Feb;12:11.
- Kaur M, Chauhan A, Manzar MD, Rajput MM. Maternal Anaemia and Neonatal Outcome: A Prospective Study on Urban Pregnant Women. J Clin Diagn Res. 2015Dec;9(12):QC04-8.
- Bodnar LM, Platt RW, Simhan HN. Early-Pregnancy Vitamin D Deficiency and Risk of Preterm Birth Subtypes. Obstet Gynecol. 2015 Feb;125(2):439-47.
- 17. Kathpalia SK, Brig, Krishan K, Sharma A, Cdr W. Complications in pregnancies after in vitro fertilization and embryo transfer. Med J Armed Forces India. 2016 Jul;72(3):211-4.
- Pattar M, Das L. A study of morbidity and mortality profile among preterms suffering from Hyaline Membrane Disease in a tertiary care hospital in Cuttack, India. Int J Contemp Pediatr. 2018;5:1330-3.
- 19. Glass HC, Costarino AT, Stayer SA, Brett C, Cladis F, Davis PJ. Outcomes for Extremely Premature Infants. Anesth Analg. 2015 Jun; 120(6):1337-51.

Cite this article as: Maheswari K, Sharma N. Magnitude, risk factors and outcome of low birth weight babies admitted to neonatal intensive care unit of a tertiary care centre in Puducherry, India. Int J Contemp Pediatr 2020;7:1389-93.