

A Clinical Study of Very Low Birth Weight Babies

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Received: 26-02-2023 / Revised: 24-03-2023 / Accepted: 20-04-2023

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Conflict of interest: Nil

Abstract

Background: Low birth weight is a valuable public health indicator of maternal health, nutrition, health care delivery & poverty. WHO defines Very Low Birth Weight (VLBW) as birth weight <1500 gms. VLBW babies have serious long term complications like neurological disability, impaired language development, impaired academic achievement. The study of maternal factors influencing VLBW, use of antenatal corticosteroids & their influence on fetal outcome in terms of NICU admission, duration of stay in NICU & further neurodevelopment of babies is essential to reduce the morbidity & mortality among VLBW babies.

Materials And Methods: This was a prospective study conducted on all live newborn infants with birth weight in range of 500 – 1500 gms who required immediate NICU admission after birth from October 2021 to September 2022 at Adichunchangiri Institute Of Medical Sciences.

Results: Out of total cases, most pregnant women age ranged between 22 to 27 years, 63% were primiparous, 37% were multiparous, 73% were singleton pregnancies while 27% were twin pregnancies, 20% had preeclampsia, 6% had abruption, risk of gestational diabetes and hypothyroidism was 1% each, 64% mothers had received antenatal corticosteroids, 46% delivered vaginally and 54% by cesarean delivery. All babies were admitted to NICU immediately after birth, 83% babies survived to discharge, 6% died, 11% got discharged against advice. Among NICU admission 12% babies stayed for <10 days, 48% for 10-20 days & remaining 40% needed prolonged stay for >30 days.

Conclusion: Proper antenatal care reduces risk of VLBW babies along with improving the survival chances and also reduces morbidity & mortality among VLBW babies.

Keywords: Low birth weight, NICU, Neurodevelopment.

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Introduction

Low birth weight is a valuable public health indicator of maternal health, nutrition, health care delivery & poverty. The birth weight of an infant is the first weight recorded after birth, ideally measured within the first hours after birth, before significant postnatal weight loss has occurred.

The World Health Organization classifies newborn infants by weight, an infant with a birth weight < 1,500 g is classified as a very low birth weight infant (VLBWI), and an infant with a birth weight < 1,000 g is classified as an extremely low birth weight infant (ELBWI).

The reason for using this classification is that VLBWIs and ELBWIs are high risk infants belonging to early preterm infants and are at high risks of death. Neonates with low birth weight have a >20 times greater risk of dying than neonates with birth weight of >2500 g.

Therefore, the survival rate (SR) of VLBWIs and ELBWIs is generally analyzed as a criterion for determining the prognosis of survival of preterm infants.

LBW babies have serious long-term neurologic disability, impaired language development, impaired academic achievement, and increased risk of chronic diseases including cardiovascular disease and diabetes. Preterm infants carry additional risk due to immaturity of multiple organ systems, including intracranial hemorrhage, respiratory distress, sepsis, blindness and gastrointestinal disorders. Preterm birth is the

leading cause of all under-5 child mortality worldwide.

The study of maternal factors influencing VLBW, use of antenatal corticosteroids & their influence on fetal outcome in terms of NICU admission, duration of stay in NICU & further neurodevelopment of babies is essential to reduce the morbidity & mortality among VLBW babies.

Materials and Methods

This is a prospective study conducted at the department of obstetrics and gynaecology at Adichunchanagiri Institute Of Medical Sciences on all live newborn infants with birth weight in range of 500 – 1500 gms who required immediate NICU admission after birth from October 2021 to September 2022. A detailed maternal history like age, socio economic status, parity, gestational age, comorbidities, regarding antenatal corticosteroids, mode of delivery and fetal details like sex of the fetus, birth weight, colour of amniotic fluid, Apgar at 1 and 5 minute, need for NICU admission, duration of stay, neonatal outcome and follow up for any neurodevelopmental delay is recorded. The study of all both maternal and fetal factors is necessary to reduce perinatal morbidity and mortality.

Results

The present study was conducted from October 2021 to September 2022. The baseline characteristics of the women in the study group are shown in the below tables

Table 1: Distribution of patients based on demographic data

Demographic data	Number (n=28)	Percentage (%)
Age (Years)		
19-20	4	14.29
21-25	19	67.86
26-30	5	17.86
Socio economic status		
Lower class	5	17.86
Middle class	13	46.43

Upper lower class	10	35.71
Parity		
PRIMI	18	64.29
MULTI	10	35.71
Gestational age		
29-32 weeks	20	71.43
33-36 weeks	6	21.43
37-39 weeks	2	7.14

Among 28 women, 67.86 % were between 21-25 years, 17.86% among 26-30 years and 14.29% among 19-20 years. Majority of the women were between 21-25 years. majority of them 46.43% belong to middle class, 35.71% to upper lower class and 17.86% to lower class. About 64.29% were primigravida and 35.71% were multigravida. Most of the women were of the gestational age between 29-32 weeks i.e 71.43%, 21.43% were among 33-36 weeks and 7.14% were among 37-39 weeks.

Table 2: Comorbid conditions among study subject

Comorbid conditions		
Nil	16	57.14
PE/IUGR/OLIGOHYDRAMNIOS	5	17.86
Medical renal disease	1	3.57
Hypothyroidism	1	3.57
Gestational DM	1	3.57
Eclampsia	2	7.14
Abruption/Anemia	2	7.14

Table 2 shows the co-morbid conditions associated with the mothers, 57.14% had no associated co-morbid conditions, 17.86% were associated with Pre-eclampsia and IUGR along with oligohydramnios, Medical renal disease, Hypothyroidism and Gestational diabetes mellitus had incidence of 3.57% each, and Eclampsia and Abruptio placenta with anemia was associated with 7.14% women.

Table 3: Distribution of patients based on clinical data

Clinical data	Number (n=28)	Percentage (%)
Singleton/Twins		
Singleton	22	78.57
DCDA Twin	6	21.43
PPROM		
Yes	6	21.43
No	22	78.57
Antenatal steroids		
Yes	16	57.14
No	12	42.86
Mode delivery		
LSCS	15	53.57
Vaginal delivery	13	46.43

The tables 3 shows the clinical aspects associated among women delivering very low birth weight babies, 78.57% were singleton pregnancies while 21.43% were twin gestation; only 21.43% presented with preterm prelabour rupture of membranes while 78.57% had intact membranes. Among them 57.14% took steroid prophylaxis while 42.86% had no prophylaxis. Majority of women 53.57% underwent cesarean delivery while 46.43% had vaginal delivery.

Table 4: Distribution of patients based baby related outcomes

Baby related	Number (n=28)	Percentage (%)
Gender of baby		
Male	14	50.00
Female	14	50.00
Amniotic fluid		
Clear	25	89.29
MSAF	3	10.71

Table 4, shows the details of the very low birth weight babies, however gender distribution was equal with 50% male and 50% female babies, majority of the babies had clear amniotic fluid (89.29%), only 10.71% had meconium stained liquor.

Table 5: Reason of NICU admission

Reason of NICU admission		
Grade 1 RDS/VLBW/NEC	1	3.57
LBW/Preterm	4	14.29
Post intubation	2	7.14
VLBW	2	7.14
VLBW/Sepsis	1	3.57
VLBW/Early onset sepsis	1	3.57
VLBW/Grade 1 & 2 RDS	13	46.43
VLBW/Grade 4 RDS	1	3.57
VLBW/IUGR/RDS	1	3.57
VLBW/IUGR/RDS/HUN	1	3.57
VLBW/Perinatal asphyxia	1	3.57

Table 5 clearly describes the conditions associated for NICU admission, most of the babies were admitted for RDS followed by very low birth weight.

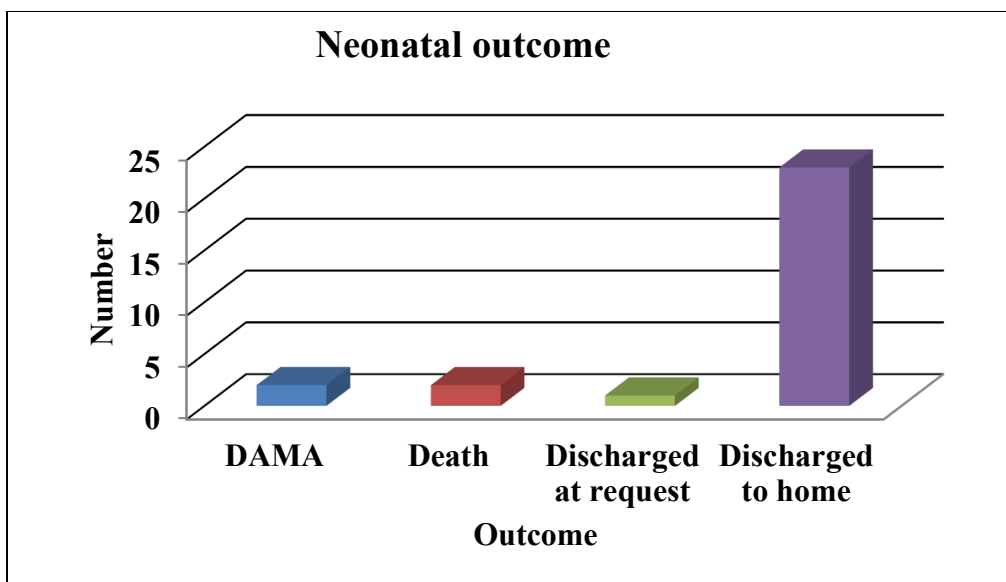


Figure 1: Neonatal outcome

Figure shows the outcome of the babies admitted in NICU, most of the babies were discharged home (82.14%), and only 3.57% were discharged at request and few babies say 7.14% each went home against advice and died.

Table 6: Average weight of babies and mean duration of stay in NICU

Birth weight (MEAN±SD)	1.23±2.45
Duration of NICU stay (MEAN±SD)	25.46±4.19

Table 7: Distribution of patients based on follow up and developmental problems

Observation	Number	Percentage (%)
Follow up	24	85.71
Development problems		
Developmental delay	4	12.50
No developmental delay	20	83.33

Table 7 shows the follow up of the babies, which showed 85.71% had normal developmental milestones while 12.50% had delayed developmental milestones.

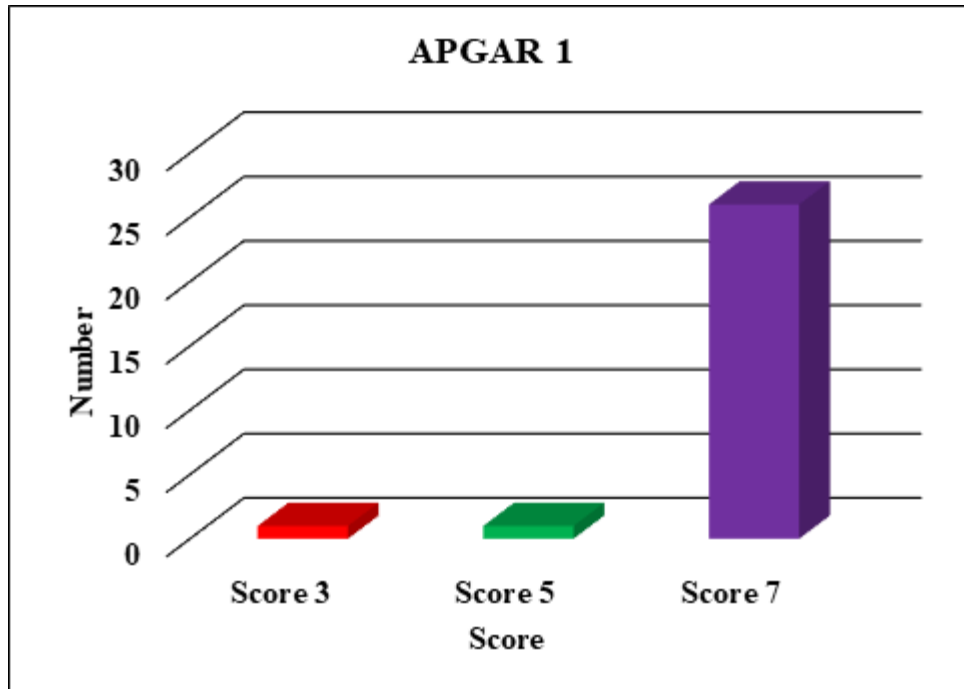


Figure 2: Distribution of patients based on APGAR 1 min

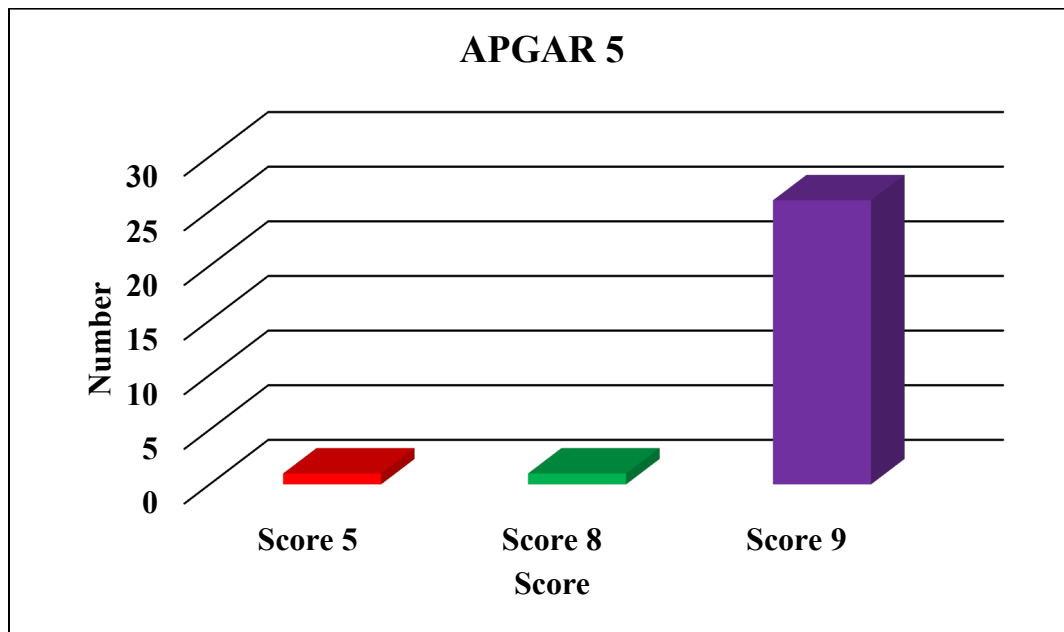


Figure 3: Distribution of patients based on APGAR 5 min

Discussion

The recent developments in the antenatal care pattern and the advances in the early identification of the maternal risk factors which have impact on the very low birth weight babies have significantly reduced the

morbidity and increased the admission to survival rates.

In present study of the total women included, maximum women had age between 21-25 years (n=19) followed by 26-30 (n=5) and

19-20 years (n=4) compared with the Daynia E Ballot et al where mean maternal age was 26.5 years. In our study 64.76% were primiparous while 37.3% were in another study. Among them only 27.5% underwent cesarean delivery in which pregnancy-induced hypertension was the indication for 45.6 % and abruption in 13%, while in our study 53.57 % underwent cesarean delivery and pre-eclampsia was the indication in only 17.86% women and abruption accounted only for 7.14%. [1,2]

In our study, 71.43% women had gestational age between 29-32 weeks followed by 21.43% between 33-36 weeks and only 7.14% between 37-39 weeks.

Of the total women under study 57.14% had no associated comorbidities and 17.86% had PE/IUGR/oligohydramnios. The other associated co-morbidities were diabetes, abruption placenta, anemia, hypothyroidism and medical renal disease. Most of the patients had singleton gestation (n=22) and only few were twin gestation. Only 21.43% had PPROM and remaining women had intact membranes at the time of admission to hospital. In mode of delivery 53.57% had cesarean delivery (n=15) compared to 46.43% women who underwent vaginal delivery (n=13). [3,4]

Based on baby gender 50.0% are male and 50.0% are female. In the study 89.29% had clear amniotic fluid and only 10.71% had MSAF. 13 babies were admitted in NICU due to VLBW/Grade1&2 RDS followed by 4 LBW/Preterm. Majority of the babies were admitted for respiratory distress syndrome. 1.23 kg is the mean birth weight and 24.46 days is the mean duration of NICU stay.

In final outcome 82.1% are discharged home and 3.57 % discharged on request. 7.14% went against advice and 7.14% babies died. In our study there was significant improvement in the survival without any major morbidity, which is comparable to the

study done by Henry et al (2017), where the mortality rates were 10.9% while the mortality in our study is 7.14%. The admission to discharge rate is 82.14%. [5]

Out of total babies, 85.71% had follow up at 6 months and 9 months, in this only 12.50% babies showed delayed developmental milestones like tracking objects with their eyes, delayed neck holding, grabbing objects with hands, sitting with and without support while remaining had normal developmental milestones.

When analysed the mother's of the delayed milestones babies, 25% had reversal of cerebro placental flow ratio, 50% had pre-eclampsia /eclampsia, and 25% had abruption. So, severe pre-eclampsia / eclampsia has to be managed timely antenatally for good fetal neuro developmental outcome.

Conclusion

Antenatal care allows prevention and early identification and management of a many maternal risk factors which there by reduces the risk of prematurity and very low birth weight babies. Therefore proper antenatal care improves the survival chances and also reduces morbidity & mortality among very low birth weight babies.

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