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# AN OBSERVATIONAL STUDY ON FACTORS AFFECTING POSTNATAL WEIGHT GAIN OF VERY LOW BIRTH WEIGHT BABIES DURING NICU STAY IN A TERTIARY CARE CENTRE

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**ABSTRACT**

**Background:** In recent years, there has been a notable improvement in the survival rate of very low birth weight babies. Finding the risk factors that impede growth is essential since postnatal growth affects neurodevelopment.
**Materials and Methods:** This prospective study examined 40 very low birth weight babies in our NICU at the Department of Pediatrics, Katihar Medical College and Hospital, Katihar, Bihar, from July 2025 to December 2025. Our goal was to track how long it took to regain birth weight and investigate the risk variables that influence postnatal weight gain.
**Results:** Twenty-two of the forty newborns under study experienced a notable delay in recovering birth weight. Delays in regaining birth weight were statistically significantly correlated with risk variables, including birth weight, birth asphyxia, parenteral nutrition, respiratory distress syndrome, surfactant requirement, patent ductus arteriosus, necrotizing enterocolitis, sepsis, hyperbilirubinemia, and anemia.
**Conclusion:** A linear relationship between postnatal growth velocity and neurodevelopmental outcome has been shown in numerous research. Determining and controlling the variables influencing weight gain in extremely low birth weight infants is a crucial and difficult task, and anticipating the risk factors ahead of time enables us to get the desired weight gain in these babies.
**Keywords:** Very low birth weight, Postnatal growth, Neurodevelopment.

## INTRODUCTION

Babies weighing less than 2.5 kg at delivery are classified as low birth weight (LBW). Preterm delivery and/or small size for gestational age are two possible causes of LBW.[1] Low birth weight (LBW) babies weigh between 1500 and 2499 grams, very low birth weight (VLBW) babies weigh between 1000 and 1499 grams, and extremely low birth weight (ELBW) babies weigh less than 1000 grams.[2] Live births before the 37th week of gestation are referred to as preterm births, and VLBW and ELBW newborns are typically preterm births.[1,2] The burden of LBW is largest in developing countries (96.5%), with a prevalence of 15.5%.Furthermore, it has been estimated that the prevalence of VLBW is 2%.[3] Most VLBW babies are preterm and have underdeveloped organs. Neonatal sepsis, necrotizing enterocolitis (NEC), respiratory distress syndrome (RDS), patent ductus arteriosus (PDA), nosocomial infections, intraventricular hemorrhage (IVH), and metabolic abnormalities are among the difficulties they may have.[2] Approximately 20.6 million preterm births are reported each year, making low birth weight and prematurity the second most common cause of death globally. The week of birth affects both the mortality and the severity of illness in preterm deliveries, and the risk increases for VLBW newborns. Neonatal mortality thus increases logarithmically with decreasing birth weight and/or gestational age.[2,4] Nevertheless, the chance of

survival has increased due to advancements in newborn critical care.[2] Growth depends on nutrition, and for VLBW babies, postnatal growth resumption is the goal in order to improve the environment for subsequent normal development.[5] Although the World Health Organization (WHO) advises children to be exclusively breastfed for the first six months of their lives, data from developed nations indicates that VLBW newborns are vulnerable to the consequences of early nutritional deficits.[6]

In order to at least come closer to our desired weight increase objective, it is crucial that all the risk factors causing poor weight gain in extremely low birth weight infants are identified early and effectively addressed.

The time it took for very low birth weight newborns to regain their birth weight throughout their stay in the neonatal intensive care unit was observed, and the risk factors influencing weight gain in these children were investigated.

## MATERIALS AND METHODS

This prospective study examined 40 very low birth weight babies in our NICU at the Department of Pediatrics, Katihar Medical College and Hospital, Katihar, Bihar, from July 2025 to December 2025. Our goal was to track how long it took to regain birth weight and investigate the risk variables that influence postnatal weight gain. Inclusion criteria was babies less than 1500 gram admitted in NICU. Exclusion criteria included babies with severe congenital malformations, babies discharged within 14 days of birth, babies died within 14 days of birth. Data regarding the 40 babies were collected from our medical records department retrospectively pertaining to their physical, demographical characteristics, the time of initiation of first feed, the time to reach full feed, feeding modalities, the complications encountered during their NICU stay, the length of stay and the time taken to regain birth weight.

Statistical analysis was performed using SPSS (version 23.0). The continuous variable expressed as Mean and Standard deviation. Categorical variables expressed as frequency and percentage. Independent 't' test used to find the significance difference between groups. Correlations relationship between two variables analyzed by applying Pearson's coefficient. Chi square test and Fisher's Exact test were used to find out association between categorical variables, $p \leq 0.05$ was considered statistically significant.

## RESULTS

40 babies with extremely low birth weights throughout a six-month period. Twelve (30%) were moderately preterm (32 weeks to 33+6 days), six (15%) were late preterm (34 weeks to 36+6 days), two (5%) were term (≥37 weeks), and one (2.5%) was extremely preterm (≤27 weeks+6 days). Of the newborns recruited, 60% were IUGR (24), 5% were less than 1 kg, 50% weighed between 1 and 1.25 kg, and 45% weighed between 1.25 and 1.5 kg. Of these, 40% were female newborns and 60% were male. For 75% of the enrolled newborns, enteral feeding was started within 48 hours; the median time to reach full feed was 7 days, and the median time to regain birth weight was 17 days.

Of the 40 newborns, 18 (45%) regained their birth weight within 14 days, while 22 (55%) experienced a delay. Of those 22, 15 (68.2%) regained birth weight in 14 days, and 22 (55%) reached full feed in 7 days. They were all given kangaroo mother care, probiotics, human milk fortifier, oromotor stimulation, and expressed breast milk. Of the 40 newborns who were included in the study, 15 (93.75%) had a delay in regaining birth weight, and 16 were asphyxiated (APGAR <7/10 at 5 minutes). Within 14 days, 17 (70.8%) of the 24 newborns who were not asphyxiated recovered their birth weight. Only 4 (18.2%) of the 22 neonates with delayed weight gain received parenteral feeding, compared to 17 (94.4%) of the 18 neonates who regained birth weight within 14 days. Twelve of the 14 infants who had necrotizing enterocolitis experienced a delay in regaining birth weight. Umbilical venous catheterization was performed on 20 newborns. Weight gain was delayed in 14 newborns (63.6%) who received mechanical ventilation. Thirteen newborns (59.1%) needed surfactant. During their time in the NICU, 23 newborns needed CPAP, and 36 newborns were on O2 support. Five newborns experienced thrombocytopenia. 16 newborns (72.7%) needed blood transfusions. Eleven (50%) of the twenty-two newborns with delayed weight gain had sepsis (blood culture indicating growth). Neonatal hyperbilirubinemia occurred in 24 newborns. During their time in the NICU, 17 newborns with delayed weight gain (77.3%) experienced hypoglycemia at some point. 17 newborns had an electrolyte imbalance, and 39 needed ionotropic support. Twelve of the fifteen infants with patent ductus arteriosus showed delayed weight gain. Of the 22 neonates that experienced a delay, 11 (50%) had IVH, whereas none of the 18 neonates who regained birth weight within 14 days had interventricular haemorrhage. [Table 1]

**Table 1: Risk factors with statistically significant association with postnatal delay in weight gain of very low birth weight babies**

| Parameter | Among 40 VLBW babies | Delay in regaining birth weight>14 days | P value |
|---|---|---|---|
| Birth weight <1 kg | 2 | 2 | |
| 1-1.25 kg | 20 | 14 | 0.056 |

| | | | |
|---|---|---|---|
| 1.25-1.5 kg | 18 | 6 | |
| Birth asphyxia | 16 | 15 | <0.001 |
| Feeding tolerance/NEC | 14 | 12 | 0.004 |
| Delay in reaching full feeds more than 7 days | 18 | 15 | 0.001 |
| Ventilator | 16 | 14 | 0.001 |
| Anemia/blood transfusion | 16 | 16 | <0.001 |
| Sepsis | 11 | 11 | <0.001 |
| Hypoglycemia | 17 | 17 | <0.001 |
| Patent ductus arteriosus | 15 | 12 | 0.014 |
| Interventricular haemorrhage | 11` | 11 | <0.001 |

## DISCUSSION

Of the 40 newborns, 22 suffered delays and 18 regained birth weight within 14 days. The average birth weight was 1.238 kg, which is similar to 1.257 kg ±190.7 g in a research by Modi et al.[7] Of the newborns recruited, 75% started enteral feeding within 48 hours. The median time to reach full feed was 7 days, and the median time to regain birth weight was 17 days, which is comparable to 15.9 days to 16.4 days in the study by Njokanma OF et al.[9]In our study, 94.4% of babies who regained birth weight within 14 days were started on enteral feeds before 48 hours, which is comparable to the result of Ballot et al.[8] RA Ehrenkranz, on the other hand, reported that it took 11–18 days to restore birth weight.[10] Similar to Srivastava P et al,[11]17 (94.4%) of the 18 neonates in our study who reached birth weight within 14 days received parenteral nutrition. Risk factors affecting postnatal weight gain that had a statistically significant association with a $p \leq 0.05$ included birth weight <1.25 kg, extreme prematurity, birth asphyxia, need for ventilator and surfactant administration, late initiation of trophic feeding, necrotizing enterocolitis, sepsis, anemia and blood transfusion, patent ductus arteriosus, interventricular hemorrhage, and metabolic abnormalities like hypoglycemia.

## CONCLUSION

A linear relationship between postnatal growth velocity and neurodevelopmental outcome has been shown in numerous research. Determining and controlling the variables influencing weight gain in infants with extremely low birth weights is a crucial and difficult aspect. Early trophic feeding commencement, early and quick parenteral nutrition augmentation, and early achievement of full feeds (within 7 days) were all characteristics of the neonates in our study who regained birth weight early, i.e., those with good growth velocity. By anticipating the risk factors ahead of time, it is possible to help these babies grow the appropriate amount of weight, which benefits their neurodevelopment.

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