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# Association between Early Breastfeeding Initiation and Neonatal Outcomes in Low-Birth-Weight Infants

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## ABSTRACT

**Background:** Low birth weight (LBW) infants are highly vulnerable to neonatal morbidity and mortality because of poor immunity, feeding difficulties, and thermoregulation problems. Early initiation of breastfeeding (within one hour of birth) has been recommended as an effective intervention to improve neonatal survival and health outcomes. The aims to evaluate the association between early breastfeeding initiation and neonatal outcomes among low-birth-weight infants admitted to a tertiary care hospital.

**Methods:** A prospective observational study was conducted among 120 low birth weight neonates admitted to the neonatal unit of a tertiary care teaching hospital over a period of 12 months. Neonates were divided into two groups based on timing of breastfeeding initiation: early initiation (within 1 hour) and delayed initiation (after 1 hour). Demographic details, feeding practices, neonatal complications, duration of hospital stay, and mortality were assessed and analyzed statistically using chi-square test and independent t-test.

**Results:** Among 120 LBW infants, 68 (56.7%) received breastfeeding within one hour of birth, while 52 (43.3%) had delayed initiation. Neonates with early breastfeeding initiation had significantly lower incidence of hypoglycemia (11.8% vs 32.7%), neonatal sepsis (8.8% vs 26.9%), hypothermia (14.7% vs 36.5%), and prolonged hospital stay compared to delayed initiation group ($p<0.05$). Mortality was also lower in the early initiation group (2.9% vs 11.5%).

**Conclusion:** Early initiation of breastfeeding is strongly associated with improved neonatal outcomes in low-birth-weight infants. Promotion of breastfeeding within the first hour of life should be encouraged as an essential neonatal care strategy to reduce morbidity and mortality in LBW neonates.

**Key-words:** Low birth weight, Early breastfeeding initiation, Neonatal outcomes, Neonatal morbidity, Exclusive breastfeeding, Neonatal mortality

## INTRODUCTION

Low birth weight (LBW), defined as birth weight less than 2500 grams, remains a major public health concern worldwide, especially in developing countries. LBW infants contribute substantially to neonatal morbidity and mortality because of physiological immaturity, feeding intolerance, and increased susceptibility to infections.

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According to the World Health Organization, nearly 20 million low birth weight babies are born annually, with the highest burden reported in South Asia and Sub-Saharan Africa.[1] Breastfeeding is considered one of the most effective and economical interventions for neonatal survival. Early initiation of breastfeeding (EIBF), defined as initiating breastfeeding within one hour of birth, provides colostrum rich in immunoglobulins, growth factors, and anti-inflammatory mediators, which protect neonates against infections and metabolic complications.[2] Delayed breastfeeding initiation has been associated with increased neonatal mortality, sepsis, hypoglycemia, and prolonged hospital stay.[3] Low birth weight infants are particularly vulnerable to feeding difficulties because of immature sucking reflexes and

 

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reduced energy reserves. Early breastfeeding helps maintain glucose homeostasis, enhances thermal regulation, promotes maternal-infant bonding, and improves gastrointestinal maturation.[4] Several studies have demonstrated that neonates who receive breastfeeding within the first hour of life have better survival rates and a lower risk of neonatal complications compared to those with delayed initiation.[5] Despite global recommendations promoting early breastfeeding initiation, the prevalence remains suboptimal in many healthcare settings due to cesarean deliveries, maternal illness, inadequate counseling, and poor neonatal support practices.[6] Limited data are available regarding the impact of early breastfeeding initiation specifically among low birth weight infants, in tertiary care settings.

Therefore, the present study was conducted to evaluate the association between early breastfeeding initiation and neonatal outcomes among low birth weight infants admitted to a tertiary care hospital.

## MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Pediatrics and Neonatology of a tertiary care teaching hospital over a period of 12 months. The study included low birth weight neonates admitted to the neonatal unit during the study period. A total of 120 low birth weight infants fulfilling the eligibility criteria were enrolled consecutively and observed for neonatal outcomes associated with the timing of breastfeeding initiation. Relevant maternal and neonatal clinical details were recorded and analyzed systematically throughout the study duration.

### Inclusion Criteria

- Neonates with birth weight less than 2500 grams
- Neonates delivered in the hospital
- Neonates admitted within 24 hours of birth
- Mothers willing to participate in the study

### Exclusion Criteria

- Major congenital anomalies
- Severe birth asphyxia
- Neonates requiring immediate surgical intervention
- Mothers with contraindications to breastfeeding
- Neonates born to HIV-positive mothers unwilling to breastfeed

**Data Collection-** Detailed maternal and neonatal demographic data were recorded, including gestational age, birth weight, mode of delivery, APGAR score, and timing of breastfeeding initiation. Neonates were categorized into:

- Early initiation group: breastfeeding initiated within 1 hour of birth
- Delayed initiation group: breastfeeding initiated after 1 hour

Neonatal outcomes assessed included:

Hypoglycemia
Hypothermia
Neonatal sepsis
NICU stay duration
Neonatal mortality

**Statistical Analysis-** Data were entered into Microsoft Excel and analyzed using SPSS version 25. Continuous variables were expressed as mean ± standard deviation and categorical variables as percentages. Chi-square test was used for comparison of categorical variables, while independent t-test was used for continuous variables. A p-value <0.05 was considered statistically significant.

## RESULTS

Cesarean delivery was significantly more common in the delayed initiation group, while other demographic variables were comparable between groups (Table 1).

**Table 1:** Demographic Characteristics of Study Population

| Variable | Early Initiation (n=68) | Delayed Initiation (n=52) | p-value |
|---|---|---|---|
| Mean Birth Weight (g) | 2180 ± 210 | 2125 ± 240 | 0.18 |
| Mean Gestational Age (weeks) | 36.1 ± 1.8 | 35.8 ± 2.0 | 0.36 |
| Male Neonates | 38 (55.9%) | 30 (57.7%) | 0.84 |
| Cesarean Delivery | 20 (29.4%) | 24 (46.1%) | 0.04 |

Low birth weight infants with delayed breastfeeding initiation had significantly higher rates of hypoglycemia, hypothermia, sepsis, and feeding intolerance compared to those with early initiation (Table 2).

 

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**Table 2:** Neonatal Morbidity in Study Groups

| Morbidity | Early Initiation (n=68) | Delayed Initiation (n=52) | p-value |
|---|---|---|---|
| Hypoglycemia | 8 (11.8%) | 17 (32.7%) | 0.006 |
| Hypothermia | 10 (14.7%) | 19 (36.5%) | 0.005 |
| Neonatal Sepsis | 6 (8.8%) | 14 (26.9%) | 0.008 |
| Feeding Intolerance | 7 (10.3%) | 15 (28.8%) | 0.01 |

Early breastfeeding initiation was associated with shorter hospital stay, lower NICU admission rate, and reduced neonatal mortality (Table 3).

**Table 3:** Hospital Stay and Mortality Outcomes

| Outcome | Early Initiation | Delayed Initiation | p-value |
|---|---|---|---|
| Mean Hospital Stay (days) | 5.8 ± 2.1 | 8.4 ± 3.3 | 0.001 |
| NICU Admission | 14 (20.6%) | 23 (44.2%) | 0.004 |
| Mortality | 2 (2.9%) | 6 (11.5%) | 0.048 |

Delayed initiation of breastfeeding was more frequently observed among mothers who underwent cesarean section (Table 4).

**Table 4:** Association between Mode of Delivery and Breastfeeding Initiation

| Mode of Delivery | Early Initiation | Delayed Initiation |
|---|---|---|
| Vaginal Delivery | 48 (70.6%) | 28 (53.9%) |
| Cesarean Section | 20 (29.4%) | 24 (46.1%) |

Low birth weight infants with early breastfeeding initiation showed significantly better feeding outcomes, including higher rates of exclusive breastfeeding and lower requirement for formula supplementation. Delayed initiation was associated with poor sucking reflex and inadequate feeding frequency (Table 5).

**Table 5:** Feeding Characteristics Among Low-Birth-Weight Infants

| Feeding Characteristic | Early Initiation (n=68) | Delayed Initiation (n=52) | p-value |
|---|---|---|---|
| Successful Exclusive Breastfeeding at Discharge | 60 (88.2%) | 34 (65.4%) | 0.003 |
| Need for Formula Supplementation | 9 (13.2%) | 21 (40.4%) | 0.001 |
| Poor Sucking Reflex | 7 (10.3%) | 18 (34.6%) | 0.002 |
| Feeding Frequency <8 times/day | 11 (16.2%) | 24 (46.1%) | 0.001 |

More than half of the low-birth-weight infants were initiated on breastfeeding within the first hour of life, while delayed initiation was observed in a substantial proportion of neonates (Fig. 1).

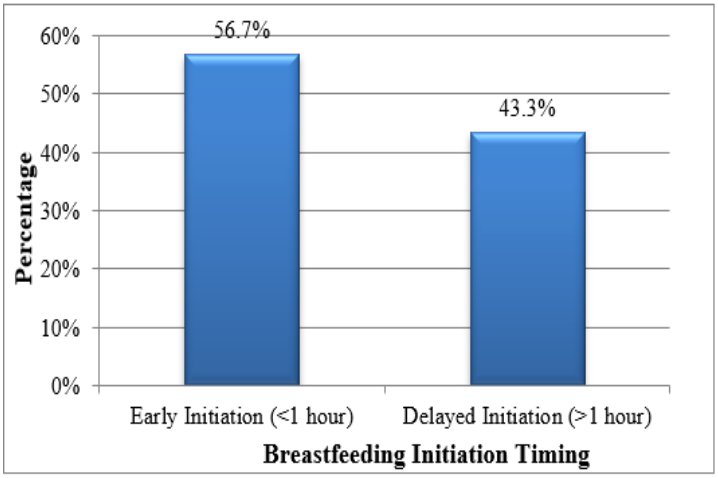


**Fig. 1:** Distribution of Timing of Breastfeeding Initiation

## DISCUSSION

The present study demonstrated a significant association between early breastfeeding initiation and improved neonatal outcomes among low-birth-weight infants. Neonates who were breastfed within the first hour of life showed lower rates of hypoglycemia, hypothermia, neonatal sepsis, prolonged hospital stay, and mortality compared to infants with delayed breastfeeding initiation. Similar benefits of interventions promoting early breastfeeding initiation have also been reported in systematic reviews conducted in South Asian neonatal populations.[7]

In the current study, hypoglycemia was significantly lower among infants who received breastfeeding within

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one hour after birth. Low birth weight infants are particularly susceptible to metabolic instability because of inadequate glycogen reserves and immature metabolic adaptation. Early breastfeeding provides an immediate source of glucose and nutrients that help maintain glucose homeostasis during the early neonatal period.[8] Similar observations have been reported in previous neonatal studies evaluating feeding practices in vulnerable infants. The incidence of hypothermia was also significantly lower among neonates with early breastfeeding initiation. Early breastfeeding, along with close maternal contact, contributes to improved thermal regulation and reduced heat loss in newborns. Low birth weight infants are especially prone to hypothermia because of limited brown fat stores and immature temperature control mechanisms.[9] Early skin-to-skin contact has been shown to improve neonatal temperature stability and physiological adaptation after birth. This finding is consistent with studies on kangaroo mother care, which demonstrated that early maternal contact and breastfeeding significantly reduce cold stress, morbidity, and mortality among low birth weight infants.[10] Similarly, previous systematic reviews have reported that interventions promoting early breastfeeding and maternal bonding improve neonatal outcomes and reduce complications related to prematurity and low birth weight.[11] Neonatal sepsis was considerably lower among infants receiving breastfeeding within one hour of birth. Colostrum contains immunoglobulins, lactoferrin, leukocytes, and several antimicrobial factors that provide passive immunity and protect newborns against infections.[2] Early exposure to breast milk may therefore reduce bacterial colonization and enhance neonatal immune defense during the critical early neonatal period. The present study also demonstrated shorter hospital stays and lower NICU admission rates among infants with early breastfeeding initiation. Better feeding tolerance, improved immunity, and enhanced metabolic adaptation among early breastfed infants may contribute to earlier recovery and reduced need for prolonged intensive care.[12] Cesarean section was identified as an important factor associated with delayed breastfeeding initiation in the present study. Mothers undergoing cesarean delivery often experience postoperative discomfort, delayed recovery, and temporary separation from the newborn, which may interfere with immediate breastfeeding practices.[13] Strengthening breastfeeding counseling, lactation assistance, and baby-friendly hospital initiatives may help improve breastfeeding rates following cesarean delivery.

Overall, the findings of the present study highlight the important role of early breastfeeding initiation as a simple, low-cost, and effective intervention for improving neonatal outcomes among low-birth-weight infants. Promotion of breastfeeding within the first hour of life should therefore be encouraged as an essential component of routine neonatal care.

## CONCLUSIONS

Early initiation of breastfeeding within the first hour of life significantly improves neonatal outcomes among low-birth-weight infants. It reduces the incidence of hypoglycemia, hypothermia, neonatal sepsis, NICU admissions, prolonged hospital stay, and neonatal mortality. Healthcare professionals should actively promote immediate breastfeeding practices through maternal counseling, neonatal support programs, and baby-friendly hospital initiatives. Strengthening early breastfeeding practices can serve as an effective, low-cost, and lifesaving intervention for vulnerable low birth weight neonates.

## CONTRIBUTION OF AUTHORS

**Research concept-** Pulak Jain, Ritesh Walmik
**Research design-** Pulak Jain, Rachana Jain
**Supervision-** Pulak Jain, Rachana Jain, Ritesh Walmik
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**Data collection-** Pulak Jain, Rachana Jain, Ritesh Walmik
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