

Hypoglycemic Profile of Breastfeed Low Birth Weight Neonates

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Abstract

Background: To assess the hypoglycemic profile of breastfeed low birth weight neonates. **Subjects & Methods:** The study was conducted at Malla Reddy Medical college for women in the Department of Pediatrics from December 2020 to May 2021 in one hundred thirty low birth weight (LBW) neonates and equal age and gender-matched normal birth weight (NBW) (2.5- 3.9 Kg) neonates were assessed for blood glucose level at the age of 1 hour, 6 hours, 12 hours, 24 hours and 48 hours after delivery in early breastfeeding and delayed breastfeeding group. **Results:** There were 70 (53.8%) early breastfeeding and 60 (46.2%) delayed breastfeeding neonates. Blood glucose level recorded at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours in LBW neonates was 41.3, 42.6, 48.4, 59.5 and 68.2 and in NBW neonates was 50.2, 57.4, 67.1, 78.3 and 87.5. A significant difference was found between both groups ($P < 0.05$). A significant difference was observed at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours between early feeding (LBW), early feeding (NBW), delayed feeding (LBW), delayed feeding (NBW) ($P < 0.05$). **Conclusion:** Hypoglycemia was seen more in low birth weight as compared to normal birth weight neonates. The early breastfeeding group had less hypoglycemia compared to the delayed feeding group.

Keywords: Breastfeeding, Blood glucose, Hypoglycemia, low birth weight neonates.

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Introduction

Hypoglycemia is defined as blood glucose levels $<40\text{mg/dl}$ or plasma glucose levels $<45\text{mg/dl}$. The occurrence of hypoglycemia varies in different situations.^[1] Approximately 7% of all pregnancies are complicated by gestational diabetes mellitus (GDM) out of which an incidence of 20-27% of neonatal hypoglycemia is seen.^[2]

The overall prevalence depends on birth weight, gestational age and intrauterine growth retardation. Symptomatic hypoglycemia is uncommon.^[3] It is seen in 1-3/1000 live births as against hypoglycemia which accounts for 67% in preterm small for gestational age (SGA) to 4% in term appropriate for gestational age (AGA). Neonatal hypoglycemia usually manifests between 24- 72 hours and is preventable by early feeding.^[4]

The prognosis of these newborns with hypoglycemia depends on how promptly and efficiently hypoglycemia is managed.^[5] The maintenance of normoglycemia in newborns depends upon the adequacy of glycogen stores, maturation of glycogenolytic and gluconeogenic pathways and integrated endocrine response. Low birth weight (LBW) has been defined

by the World Health Organization (WHO) as a birth weight of an infant of 2499gm or less, regardless of gestational age.^[6]

Breast milk is critical for sustaining newborn infant health and wellbeing. Infants who are properly breastfed grow better and experience less sickness and fewer deaths than other infants who are not breastfed.^[7] Breastfeeding helps infants reach their full health, development, and psychosocial potential. Breastfeeding not only reduces the rate of morbidity and mortality in children but also reduces the likelihood of certain cancers and chronic diseases in mothers.^[8] Considering this, the present study aimed at assessing the hypoglycaemic profile of breastfeeding low birth weight, neonates.

Subjects and Methods

The study was conducted at Malla Reddy Medical college for women in the Department of Pediatrics from December 2020 to May 2021 in one hundred thirty low birth weight (LBW) neonates were selected for the study. All neonates having neonatal hypoglycemia were included in the study. We also recruited equal age and gender-matched normal birth weight (NBW) (2.5- 3.9 Kg) neonates. Approval from

higher authorities was obtained once their parents agreed to participate in the study.

All relevant information was recorded in the case history file. From all neonates, capillary blood was collected by heel prick after proper aseptic measure for screening by reagent strips method and at the same time, venous blood sample was sent for laboratory confirmation by glucose oxidase method in an auto-analyzer. Assessment of blood glucose level was measured at the age of 1 hour, 6 hours, 12 hours, 24 hours and 48 hours after delivery. Early breastfeeding was the initiation of breastfeeding within 1 hours of delivery and delayed breastfeeding was beyond 1 hours of delivery was done. Results of the present study after recording all relevant data were subjected to statistical inferences using the chi-square test. The level of significance was significant if the p-value is below 0.05 and highly significant if it is less than 0.01.

Results

Table 1: Distribution of neonates

| Feeding | Number | Percentage |
|-----------------|--------|------------|
| Early feeding | 70 | 53.8 |
| Delayed feeding | 60 | 46.2 |

There were 70 (53.8%) early breastfeeding and 60 (46.2%) delayed breastfeeding neonates [Table 1].

Blood glucose level recorded at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours in LBW neonates was 41.3, 42.6, 48.4, 59.5 and 68.2 and in NBW neonates was 50.2, 57.4, 67.1, 78.3 and 87.5. A significant difference was found between both groups ($P < 0.05$) [Table 2, Figure 1].

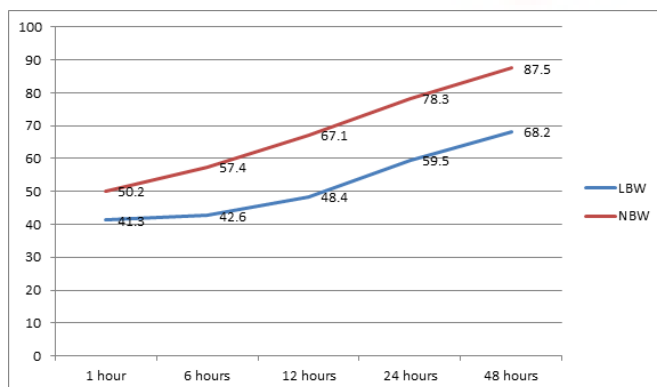


Figure 1: Blood Glucose levels.

A significant difference was observed at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours between early feeding (LBW),

early feeding (NBW), delayed feeding (LBW), delayed feeding (NBW) ($P < 0.05$) [Table 3, Figure 2].

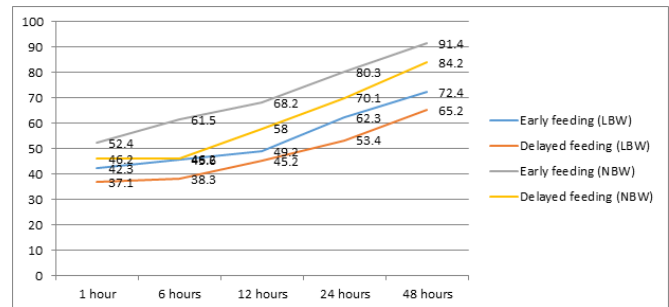


Figure 2: Blood glucose level in early and delayed breastfeeding neonates

Discussion

The endocrine events believed to trigger the release of glucose and the metabolism of fat from peripheral stores are an increase in adrenaline secretion and rapid fall in insulin: glucagon ratio during the first few hours of life.^[9] These endocrine changes increase the activities of the essential enzyme for glycogenolysis (release of glucose from stored glycogen in liver, cardiac muscles and brain), gluconeogenesis, lipolysis and ketogenesis, namely glycogen phosphorylase, phosphoenolpyruvate carboxykinase, lipoprotein lipase and hydroxymethylglutaryl-CoA synthase respectively. Usually, the transition from intra-uterine glucose regulation to extra-uterine adaptation develops in the first 24 hours of age.^[10] The Academy of Breastfeeding Medicine (ABM) recommends placing the at-risk newborns in skin-to-skin position with their mothers and manages glucose levels with breastfeeding or hand expressed colostrum feedings every one to two hours. Baby-Friendly Hospital Initiative (BFHI) recommends skin-to-skin breastfeeding and colostrum feeding in the first hour after birth (World Health Organization, UNICEF. The AAP algorithm does not specifically indicate what to feed or where the newborn is while being monitored for hypoglycemia. The AAP algorithm outlines the management of hypoglycemia while the ABM and the BFHI recommend the prevention of hypoglycemia.^[11] The present study aimed at assessing the hypoglycaemic profile of breastfeeding low birth weight neonates.

We had taken One hundred thirty low birth weight (LBW) neonates. An equal number of normal birth weight (NBW) neonates was also taken in the study. De et al,^[12] conducted a study among 150 term and preterm babies with birth weight between 1.5 kg and 3.99 kg. Blood glucose values were measured at the age of 1 hour, 6 hours, 12 hours, 24 hours and 48 hours after delivery. The incidence of

Table 2: Assessment of blood glucose level

| Blood glucose level (mg/dl) | LBW | NBW | P-value |
|-----------------------------|------|------|-------------|
| 1 hour | 41.3 | 50.2 | Significant |
| 6 hours | 42.6 | 57.4 | Significant |
| 12 hours | 48.4 | 67.1 | Significant |
| 24 hours | 59.5 | 78.3 | Significant |
| 48 hours | 68.2 | 87.5 | Significant |

Table 3: Blood glucose level in early and delayed breastfeeding neonates

| Blood glucose level (mg/dl) | Early feeding (LBW) | Delayed feeding (LBW) | Early feeding (NBW) | Delayed feeding (NBW) | P-value |
|-----------------------------|---------------------|-----------------------|---------------------|-----------------------|-------------|
| 1 hour | 42.3 | 37.1 | 52.4 | 46.2 | Significant |
| 6 hours | 45.6 | 38.3 | 61.5 | 46.2 | Significant |
| 12 hours | 49.2 | 45.2 | 68.2 | 58.0 | Significant |
| 24 hours | 62.3 | 53.4 | 80.3 | 70.1 | Significant |
| 48 hours | 72.4 | 65.2 | 91.4 | 84.2 | Significant |

hypoglycemia was 32% in this study. Hypoglycemia was significantly greater in SGA and preterm as compared to AGA and term newborns respectively ($P < 0.001$). Incidence of hypoglycemia was significantly more in newborns with delayed breastfeeding than early breastfeeding (64% vs 17%; $P < 0.001$).

It was found that there were 70 (53.8%) early breastfeeding and 60 (46.2%) delayed breastfeeding neonates. Blood glucose level recorded at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours in LBW neonates was 41.3, 42.6, 48.4, 59.5 and 68.2 and in NBW neonates was 50.2, 57.4, 67.1, 78.3 and 87.5. Saini et al,^[13] in their study among 50 neonates, 12 (24%) had one or more episodes of hypoglycemia. Among 20 episodes of hypoglycemia; 15 (75%) in the first 24 hours and 5 (25%) between 49-72 hours all the episodes were asymptomatic. Out of 12 hypoglycemic neonates, 7 (58.3%) were small for gestational age (SGA) and 5 (41.7%) were AGA. Sepsis was significantly noticed after hypoglycemia ($p = 0.00$). The pattern of blood glucose levels was significantly different among hypoglycemic babies and normoglycemic babies over the first 72 hours.

In this study we observed a significant difference at 1 hour, 6 hours, 12 hours, 24 hours and 48 hours between early feeding (LBW), early feeding (NBW), delayed feeding (LBW), delayed feeding (NBW). Saifuddeen et al,^[14] included a total of 100 consecutively born breastfed late preterm neonates in which blood glucose was done at 0, 1, 3, 6, 12, 24, 48 and 72 hours of life to identify hypoglycemia. It was found that the overall incidence of hypoglycemia was 15%. Out of 15 hypoglycemic babies 12 (80%) developed symptoms and only 3 (20%) were asymptomatic. Most (90%) of the hypoglycemia occurred on the first day of life. Babies born

to primi mothers were more prone to hypoglycemia (25%). The highest incidence was seen in babies weighing less than 2 kg (50%). Symptoms of hypoglycemia included poor feeding (66%), lethargy (58%), jitteriness (41%), and weak cry (25%).

Conclusion

It was found that hypoglycemia was seen more in low birth weight as compared to normal birth weight neonates. The early breastfeeding group had less hypoglycaemia compared to the delayed feeding group.

References

1. Dias E, Gada S. Glucose levels in newborns with special reference to hypoglycemia: A study from rural India. *J Clin Neonatol.* 2014;3(1):35. Available from: <https://dx.doi.org/10.4103/2249-4847.128729>.
2. Jonas D, Dietz W, Simma B. Hypoglycemia in Newborn Infants at Risk. *Klin Padiatr.* 2014;226:287–291. Available from: <https://dx.doi.org/10.1055/s-0034-1385928>.
3. Yoon JY, Chung HR, Choi CW, Yang SW, Kim BI. Blood glucose levels within 7 days after birth in preterm infants according to gestational age. *Ann Pediatr Endocrinol Metab.* 2015;20(4):213–222. Available from: <https://dx.doi.org/10.6065/apem.2015.20.4.213>.
4. Dashti N, Einollahi N, Abbasi S. Neonatal hypoglycemia: prevalence and clinical manifestations in Tehran children's hospital. *Pakistan J Med Sci Online.* 2007;23(3):340–343.
5. Budhathoki S, Poudel P, Bhatta NK, Singh RR, Shrivastava MK, Niraula SR. Clinic epidemiological study of low birth weight newborns in eastern part of Nepal. *Nepal Med Coll J.* 2014;16(2-4):190–193.

6. Burdan DR, Botiu V, Teodorescu D. Neonatal hypoglycemia. The incidence of the risk factors in savatorvuia obstetrics gynecology hospital, Arad. *Timisoara Med J.* 2009;59(78):5.
7. Hawdon JM, Beer J, Sharp D, Upton M. Neonatal hypoglycaemia: learning from claims. *Arch Dis Child Fetal Neonatal Ed.* 2017;102(2):110–115. Available from: <https://dx.doi.org/10.1136/archdischild-2016-310936>.
8. Cornblath M, Schwartz R, Lucas A, Morley R. Outcome of neonatal hypoglycaemia. *BMJ.* 1999;318(7177):194. Available from: <https://dx.doi.org/10.1136/bmj.318.7177.194a>.
9. Lubchenco LO, Bard H. Incidence of hypoglycemia in newborn infants classified by birth weight and gestational age. *Pediatrics.* 1971;47:831–838.
10. Chance GW, Bower BD. Hypoglycemia and Temporary Hyperglycemia in Infants of Low Birth Weight for Maturity. *Arch Dis Child.* 1966;41:279–285. Available from: <https://dx.doi.org/10.1136/adc.41.217.279>.
11. Fluge G. Clinical Aspects of Neonatal Hypoglycemia. *Acta Paediatrica.* 1974;63(6):826–832. Available from: <https://dx.doi.org/10.1111/j.1651-2227.1974.tb04871.x>.
12. De A, Biswas R, Samanta M, Kundu C. Study of blood glucose level in normal and low birth weight newborns and impact of early breast feeding in a tertiary care centre. *Ann Niger Med.* 2011;5(2):53. Available from: [10.4103/0331-3131.92951](https://dx.doi.org/10.4103/0331-3131.92951).
13. Saini A, Gaur BK, Singh P. Hypoglycemia in low birth weight neonates: frequency, pattern, and likely determinants. *Int J Contemp Pediatr.* 2018;5(2):526. Available from: <https://dx.doi.org/10.18203/2349-3291.ijcp20180548>.
14. A SA, Shafi M. Study of Hypoglycemia in Breastfed Late Preterm Neonates. *AIMDR.* 2017;2(5):1–05. Available from: <https://dx.doi.org/10.21276/aimdr.2017.3.5.pe1>.

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