Screening For Hypoglycemia In Late Preterm Andterm Neonates

by

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ABBREVIATIONS

NICU	Neonatal Intensive care unit
LBW	Low Birth Weight
SGA	Small for gestational age
AGA	Appropriate for gestational age
LGA	Large for gestational age
IDM	Infant of Diabetic Mother
GDM	Gestational Diabetis Mellitus
GHTN	Gestational hypertension
PCV	Packed cell volume
HCT	Hematocrit
HA	Hypoglycaemic Agent
SD	Standard Deviation
EBM	Expressed Breast Milk
GH	Growth Hormone
BOHB	B-hydroxybutyrate
GIR	Glucose infusion Rate

ABSTRACT

Background:

Neonatal hypoglycemia, a common metabolic problem, often goes unnoticed owing to lack of specific symptoms. We designed this study to assess the incidence of hypoglycemia in healthy term and late pre term babies on exclusive breast feeding. Some studies have reported that long term neurological sequel may be seen to the extent of 35 % of newborns with symptomatic hypoglycaemia and up to 20% in those with asymptomatic hypoglycaemia

OBJECTIVES OF THE STUDY:

1. To determine incidence of hypoglycaemia in neonates of 34-40 weeks of gestational age who do not require NICU admission and are kept in post natal ward with mother
2. To compare incidence of hypoglycaemia in late pre term and term neonates of 34- 40weeks of gestational age

METHODOLOGY

In this prospective comparative analytical study, a convenient sample of 196 neonates of 32-40 gestational age delivered in Shri B.M. Patil Medical College, Hospital and Research Centre who do not require NICU admission and are kept in postnatal wards with mother will be included. GRBS will be checked with portable glucometer at 1 hour, 2 hours, 6 hours, 24 hours and 48 hours of life and recorded. If blood glucose level is < 45 mg/dl, sample will be collected for Laboratory evaluation of RBS.

RESULTS

- Out of 98 babies in each group, incidence of hypoglycaemia was 19.4% and 30.6% in term and late preterm babies respectively.
- Hypoglycaemia was more common in females and males in term & late preterm babies respectively.
- Hypoglycaemia was statistically significant in LBW & decreased gestational age babies.
- Incidence of hypoglycaemia in SGA term & late preterm babies was 31.6% and 40.0% respectively.
- Incidence of hypoglycaemia in IUGR term & late preterm babies was 15.8% and 36.7% respectively.
- Incidence of hypoglycaemia in LGA term & late preterm babies was 15.8% and 6.7% respectively.
- Most common feeding complaint on day 1 in term and late preterm babies was reduced sucking.
- Most common feeding complaint on day 2 in term and late preterm babies was decreased production and reduced sucking respectively.

CONCLUSION

The incidence of hypoglycaemia in healthy newborns on exclusive breastfeeding was 19.4% & 30.6% in term and late preterm babies respectively.

There was correlation between hypoglycaemia and birth weight & gestational age. Association between hypoglycaemia and SGA,IUGR & LGA was not statistically significant. About 14 & 22 of newborns developed hypoglycaemia at 1 hour of life. We conclude that healthy newborns in postnatal wards can be exclusively breastfed, but there is need to closely monitor their blood glucose levels at least in

first 48 hrs to prevent hypoglycaemia and potential neurodevelopment damage, and asymptomatic hypoglycemia in newborns can be managed with frequent breastfeeds.So more studies with larger sample size are required to see the association between these risk factors and hypoglycemia. Also more studies with long-term follow up are required to evaluate impact of this asymptomatic hypoglycemia on this population.

KEYWORDS

Neonatal hypoglycaemia, late preterm newborns, transitional hypoglycaemia ,hypoglycaemia in high risk groups

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INTRODUCTION

Late preterm infants are defined as premature infants born between 34 0/1 to 36 6/7 weeks of gestation

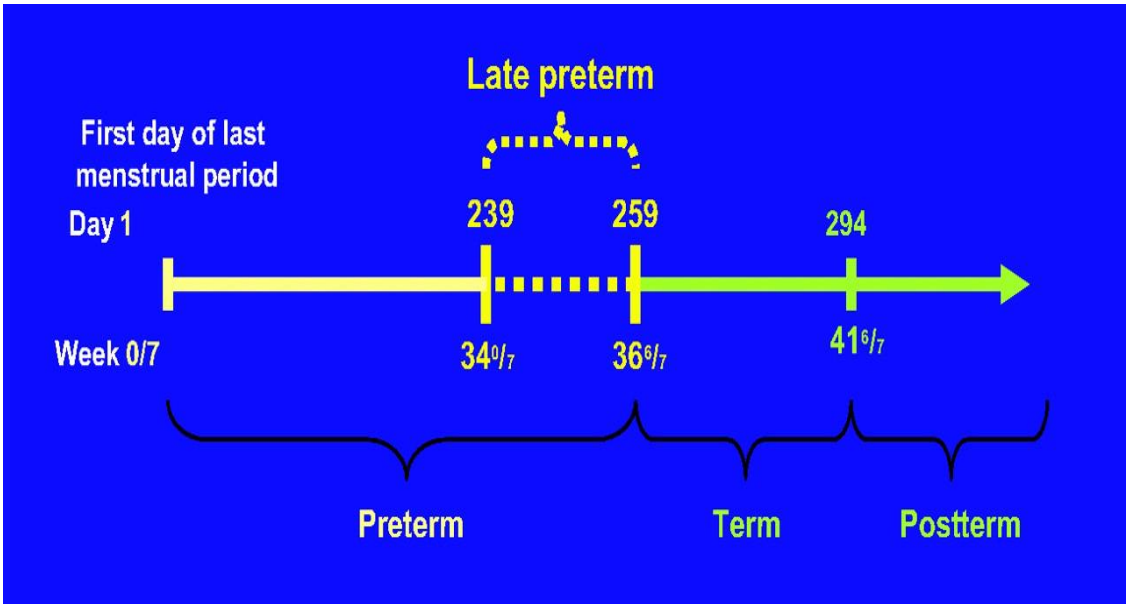


Figure 1: Representative Diagram of Late Pre-Terms[1]

Late preterm infants account for 70% of all the pre term births in US. Currently no data available measuring the incidence of late pre terms in india[2,3]

There are an increasing number of babies born at gestations of 34 0/7 to 36 6/7 weeks due to various obstetric and neonatal reasons. Late pre term infants are physiologically less mature and have limited compensatory responses to the extra uterine environment, compared with term infants. Although late pre term infants are largest sub group of pre term infants, there has been little research on this group until recently. This is mainly because of labelling them as “near term”, thus being looked upon as “almost mature”, with little need to be concerned. It was believed that these babies will have fewer problems postnatally and will do well with routine newborn care meant for a normal baby and therefore they never received the attention they deserved. it is now realized that babies born at 34 0/7 to 36 6/7 weeks should not be

considered as term babies as the magnitude of morbidities in these subset of babies is much higher . These babies should be considered as ‘late preterm’. As the late preterm subgroup accounts for nearly 10% of all births, [3] even a modest increase in any morbidity will have huge impact on overall health care resources.

Hypoglycaemia is the most common metabolic problem occurring in newborn and in the majority of cases; it merely reflects a normal process of adaptation to extra uterine life.[4]

Hypoglycaemia occurs due to failure to adapt from the foetal state of continuous trans placental glucose consumption to the extra uterine pattern of intermittent nutrient supply. Glucose is a very important substrate of metabolism especially in the brain. Severe and prolonged neonatal hypoglycaemia is associated with a risk of long term neuro developmental sequelae.

Variable incidence has been reported by various authors in different weight and gestational age group. The incidence of hypoglycaemia in neonates varies from 4 to 15 %[5]. However in the presence of certain risk factor i.e. small for date, large for date, infants of diabetic mother, prematurity etc, the chances of hypoglycaemia increases[6].

Term infants are capable of utilizing alternative energy substrates, such as ketone bodies and lactate. Their Intracerebral glycogen stores in the astrocytes and increased cerebral blood flow in response to hypoglycaemia maintain a sufficient substrate delivery[7].

But in preterm and high risk babies, there is difficulty in normal transition to extra-uterine life. This is due to immature or impaired glucose homeostasis (gluconeogenesis, glycogenolysis, lipolysis and ketogenesis) mechanism; result in low plasma glucose in this baby.

Hypoglycaemia causes damage to developing brain in neonates and it sequele in the long run is of great concern. Hence in risk babies, blood glucose monitoring should be carried out from birth and may be discontinued only if euglycaemic levels are maintained.

Hypoglycaemia in neonates can be symptomatic or asymptomatic. Symptoms are non specific such as jitteriness, tremor, seizures, apathy, lethargy, coma, poor feeding and cyanosis, weak or high pitched cry[8]. These symptoms may be easily missed. Therefore monitoring of blood glucose level in at risk neonates is required at regular intervals. .

Breastfeeding always be initial treatment option for asymptomatic hypoglycaemia. However symptomatic hypoglycaemia will be treated with parenteral dextrose.

Many studies have been done on incidence of hypoglycemia in high-risk neonates, but still there is only few study on the occurrence of hypoglycemia in exclusively breastfed high risk Newborn. We planned this study to document the incidence, time of occurrence, variable clinical presentation at the onset of hypoglycaemia in neonates who are exclusively breast fed from birth.

AIMS AND OBJECTIVES

Objective of the study:

- To determine incidence of hypoglycaemia in neonates of 34-40 weeks of gestational age who do not require NICU admission and are kept in post natal ward with mother
- To compare incidence of hypoglycaemia in late pre term and term neonates of 34- 40weeks of gestational age

REVIEW OF LITERATURE

"Hypoglycemia" refers to a decrease in the blood glucose levels. Almost 100 years ago, hypoglycemia was first described in children and more than 50 years since it was recognized in neonates and infants[9].

Some authors thought that hypoglycemia was exclusively credited to abundance insulin, while others thought hypoglycemia was due to absence of adequate glucose.

Definition hypoglycemia in newborn infant remains controversial because there is lack of significant correlation between plasma glucose concentration, clinical symptoms and long term sequelae.

Definition of Neonatal Hypoglycaemia

A numerical definition for neonatal hypoglycaemia remains controversial even today. The critical level underneath which the occurrence of neuronal damage relies upon various components including the availability of alternate energy fuels and the baby's energy demands.[10]

The glucose levels falls quickly during initial hours of life , which is normal physiological phenomenon , because the new born is in transition between complete glucose dependence of foetal state to complete glucose independence of adult state .

After 20 weeks of gestation normal level of new born glucose level is 54mg/dl. Blood glucose levels of neonate is 70% of mother blood glucose levels at the time of birth. By one hour of life it reduces quickly to 20 – 25 mg/dl. This level is temporary and starts to increase during initial hours and days of life. This is normal adaptation to establish postnatal glucose homeostasis.[11]

Euglycemia relies upon the accessibility of substrates (glycogen, amino acids, lactate, and glycerol); Integrity of the glycogenolytic, gluconeogenic, and lipolytic

pathways; and generation of the glucose-regulating hormones insulin, glucagon, adrenaline, growth hormone, and cortisol.

1. Historical Definitions

a. Epidemiologic definitions

In the statistical approach, blood glucose concentration of >2 standard deviations below the mean for a healthy population considered as hypoglycaemia. Other components to be viewed when utilizing this approach incorporate gestational and postnatal age of the infant, physiological state (pre-feed or post-feed), and the sort of milk given (breast milk or formula milk)[12]

b. clinical definition (*Whipple's triad*) that required the following[8]

i. Reliable measurement of a low glucose level

ii. Sign & symptoms consistent with hypoglycemia.

iii. Resolution of signs or symptoms after blood glucose level is restored to the normal range

2. Operational threshold[8]

The operational threshold is an indication for action and is not diagnostic of disease or abnormality.

Cornblath's description of operational thresholds[13] suggested glucose level at which intervention should be considered based on clinical experience and analysis of the available evidence. Some important features of operational thresholds are listed subsequently:

a) Lesser than therapeutic goal

b) Dependent on clinical state and age

c) Do not define normal or abnormal

d) Provide safety margin

Operational thresholds as suggested by Cornblath et al.

a) Less than 24 hours of age—30 to 35 mg/dL may be normal at one time, but threshold is raised to 45 mg/dL if it persists after feeding or if it recurs in first 24 hours.
b) After 24 hours, threshold should be increased to 45 to 50 mg/dL.

i. Symptomatic infant —45 mg/dL.
ii. Asymptomatic infants with risk factors for low blood sugar— 36 mg/ dl. Close surveillance is required and intervention is needed if plasma Glucose remains below this level, does not increase after feeding, or if abnormal clinical signs are seen.
iii. For any baby, if blood sugar levels are <20 to 25 mg/dL, IV glucose is needed to raise the plasma glucose to >45 mg/DL. Srinivasan et al recommended 'cut off values' for blood glucose levels of less than 35mg/dl in initial 3 hours, 40mg/dl between 3 and 24 hours and 45mg/dl after 24 hours of postnatal life to be considered in the hypoglycemic range[14]

3. Neuro-physiological and metabolic-endocrine function

This approach was established on changes in neurophysiologic functions, cerebral blood flow, and hormonal responses relative to different glucose concentrations.

Koh et al in a study measured sensory evoked potential in relation to blood glucose concentration in 17 kids. Aberrant evoked potential were recorded in ten of the 11 kids whose blood glucose levels fell beneath 2.6 mmol/l. Five of these 10 kids were asymptomatic. No change in evoked potential was recorded in the six kids whose blood glucose levels stayed above 2.6 mmol/l. Above finding recommend that

blood glucose concentration ought to be kept above 2.6 mmol/l to guarantee normal neural function in children irrespective of the presence or absence of abnormal clinical signs[15].

Different studies failed to demonstrate a similar response in both auditory evoked response and electroencephalogram

The Neuro developmental approach

The approach dependent on neurodevelopment outcome with respect to symptomatic or asymptomatic hypoglycemia.

Lucas et al Using Bayley motor and mental developmental scores, they assessed 661 preterm neonates at 18 months of age. They noticed the most noteworthy regression coefficient at a plasma concentration of below 2.6 mmol/L, and if these glucose levels stayed low for at least 5 sequential or separate days, the scores were less than 70, demonstrating higher neurodevelopmental deficits[14].

Metabolic and endocrine adaptation at birth[17]

Fetus in utero, glucose supply is entirely depends on mother plasma glucose levels and its diffusion across the placenta. No Glucose is produced in fetus has been demonstrated.

Once the placental severed, glucose delivery to fetus interrupted. But the neonates require maintaining normoglycemia and they require adequate glucose delivery to brain. Glucose homeostasis is accomplished by increase cortisol, glucagon, growth hormone (GH), and catecholamine level and, in combination with the suppression of insulin secretion.

These hormonal changes regulate four different metabolic systems[17]:

a) Glycogenolysis

b) Gluconeogenesis

c) Lipolysis

d) ketogenesis.

The end result is to facilitate normoglycemia until carbohydrate intake and absorption occur on a more regular basis.

In the first few hours of life, counter-regulatory mechanism in response to decreased delivery of glucose, glucagon and catecholamine levels rapidly increase, and insulin level falls. Both this mechanism shift metabolic activity from anabolism to catabolism and induces enzymes necessary for glycogenolysis (glycogen phosphorylase) and gluconeogenesis (pyruvate carboxylase and phosphoenolpyruvate carboxykinase).

Glycogenolysis main source of glucose in first 24 hours (approximately 50%). It is seen that depletion of glycogen stores from 50 mg/g of liver at birth to less than 10 mg/g of liver at 24 hours of life. Gluconeogenesis develops slowly and is not fully active until 8–12 hours of life, providing 20%–30% of glucose needs in the first 24 hours.

Lipolysis contributes to plasma glucose levels after 8–12 hours of life. Lipolysis produces glycerol, which can enter into the gluconeogenic pathways. Free fatty acids can be oxidized directly by some organs, including the heart, kidney, and skeletal muscle, but long-chain fatty acids cannot cross the blood–brain barrier.

Partial oxidation of fatty acids in the liver via ketogenesis produces ketone body such as β-hydroxybutyrate (BOHB) and acetoacetate. Brain utilizes ketone body

for metabolism. However, ketogenesis is impaired in the first 8–12 hours of life, coincident with the known transitional hypoglycemia of infancy.

So gluconeogenesis, lipolysis, and fatty acid metabolism is utmost important in breastfed infants for maintenance of blood glucose.

Gradual increase of glucagon level in first few days of birth is responsible for gradual increase and stabilization of blood glucose in normal infant by 48-72 hours.

Immaturity of the counter regulatory response can interfere with glucose homeostasis in 24 hours of life and can cause Transient hypoglycemia.

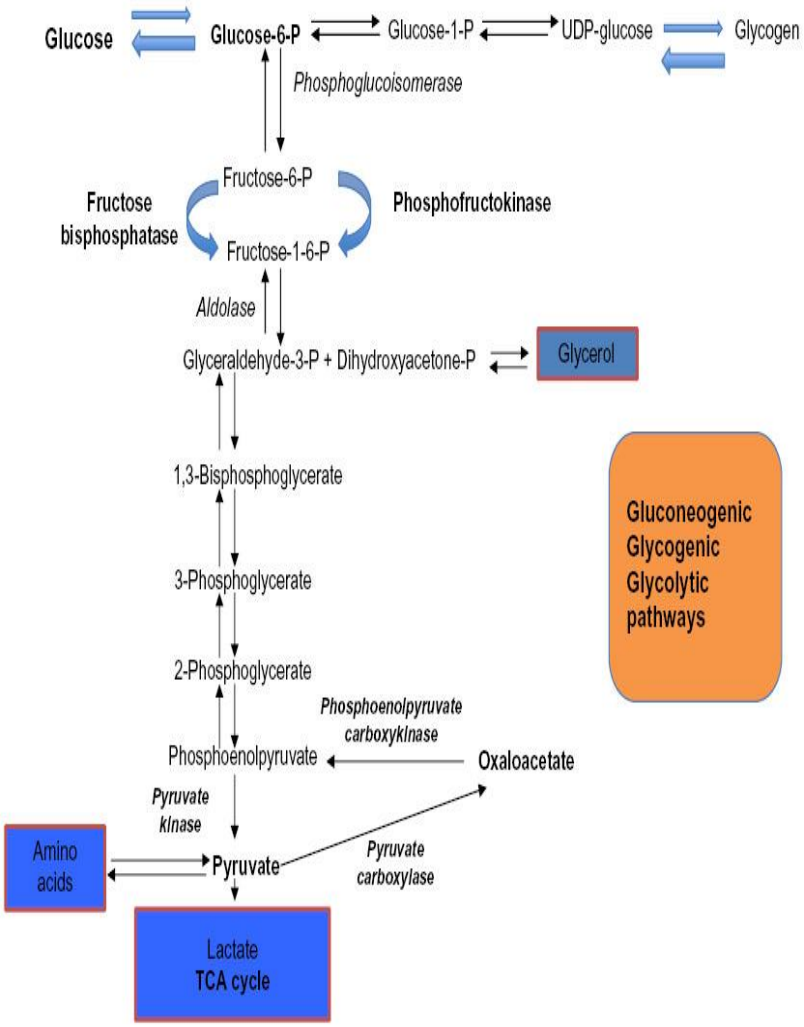


Figure 2: carbohydrate metabolism

Impaired metabolic adaptation

Neonatal hypoglycemia is either due to natural metabolic appeal for glucose in the presence of reduced accessibility of substrate, or normal substrate availability in the presence of metabolic demand that exceeds the baby's ability to compensate. The post birth period is a transition period when hypoglycemia is most common, and is usually transient, resulting from delayed or impaired metabolic adaptation. Persistent and recurrent hypoglycemia is often due to complex endocrine or congenital errors of metabolism disorders.

Causes of neonatal hypoglycemia[17]

Hyperinsulinemic

Transient:

Infants of diabetic mothers,

Intrapartum dextrose infusion into mother

Stress in peripartum/postnatal period: trauma, asphyxia, hypothermia

Small for gestational age infants

ATP-sensitive potassium channel defects

GLUD1 activating mutation

HADH mutation

GCK activating mutation

HNF1A and *HNF4A* mutations

UCP2 mutations

HK1 mutations

Beckwith–Wiedemann syndrome

Fundoplication (dumping syndrome)

Congenital disorders of glycosylation due to increased insulin levels

Adenoma of β-cells —multiple endocrine neoplasia type 1

Normoinsulinemic

Transient:

Immaturity of development in adapting to fasting: prematurity, small for gestational age High metabolic consumption: sepsis, erythroblastosis fetalis, polycythemia Maternal conditions: toxemia, administration of tocolytics (β Sympathomimetics)

Hypopituitarism

Primary adrenal insufficiency

Inborn errors of metabolism

Glycogen storage disease

Disorders of gluconeogenesis

Defects in fatty acid catabolism and ketogenesis

Organic acidurias

Galactosemia

Hereditary fructose intolerance

Transitional Neonatal Hypoglycemia

Before birth fuel metabolism of fetus depends principally on oxidation of glucose which is supplied by maternal plasma glucose whose levels are controlled by insulin secretion in mother[21]

The brain of fetus requires circulating glucose levels slightly just below those of maternal plasma glucose concentrations; the normal maternal glucose concentrations of 70-90 mg/ dL (3.9-5.0 mmol/L), the difference between fetal and maternal plasma glucose levels at term is only 9 mg/dL (0.5 mmol/L).[22]

Secretion of insulin by fetus is responsible for plasma concentration of glucose in fetus , although glucose concentrations of fetus are mainly determined by glucose concentration in mother whereas fetal insulin mainly required for growth of fetus[23]

The main feature of temporary transient neonatal hypoglycemia of newborn is that plasma glucose concentrations are lowermost during first 24 hours of life and then gradually increased over next 2-3 days to attain the normal range. One important feature of transitional neonatal hypoglycemia in normal newborns is that plasma glucose levels are lowest early on the first day of life,for older infants and children.[24]

Another significant feature of temporary transient hypoglycemia of newborn is that levels of plasma glucose are extremely well balanced and nearly not affected by timing of initiation of first feeds or time gap between subsequent feeds.[25]

Growth restricted babies[19]

Compared to premature babies, growth restricted babies are also born with stores glycogen and adipose tissue and therefore there is no unlimited capacity to deliver glucose for glycogenolysis from hepatic tissue or to synthesise precursors for gluconeogenesis via oxidation of lipids.

The concentrations of ketone bodies and fatty acids are stated to be less in growth restricted babies. The ineffective ketogenic response may be secondary to failure if mobilisation of fatty acids from fat tissues[20]

They also have low level of counter-regulatory hormone response to hypoglycaemia. They have decreased capacity to synthesize cortisol, adrenaline and nor adrenaline in response to hypoglycaemia and poor peripheral sensitivity to the actions of glucagon and insulin[15]

Hypoglycemia in growth restricted babies may occur secondary to other associated co-morbidities including polycythemia, hypoxia, hypothermia, heightened insulin receptor sensitivity

Preterm babies

Fetus accumulates both glycogen and adipose tissue in later part of pregnancy. There are various aspects that responsible for hypoglycemia in preterm babies[18]

1. The adipose tissue and glycogen storage are extremely low in preterm babies and therefore not have unlimited capacity to release glucose from the hepatic tissue via glycogenolysis or to synthesize gluconeogenic precursors via lipolysis.
2. Preterm babies have low concentrations of glucose-6-phosphatase and other enzymes which are essential for both glycogenolysis and gluconeogenesis.
3. Due to poorly developed counter-regulatory hormone response to counter hypoglycaemia, preterm babies are more at risk for neurological damage than term babies.

Diagnosis

Symptoms of hypoglycemia are non specific require high level of suspicion

i. Symptoms of hypoglycemia are

a) Tremors, jitteriness, or irritability

b) Seizures, coma

c) Lethargy, apathy, and limpness

d) Poor feeding, vomiting

e) Apnea

f) Weak or high-pitched cry

g) Cyanosis

h) Many infants may have no symptoms

ii. Screening.

Serial blood glucose levels should be routinely measured in infants who have risk factors for hypoglycemia, and in infants who have symptoms that could be due to hypoglycemia

Management[8]

Early diagnosis and the management necessary to prevent complication

1. **Feeding:** Asymptomatic infants with blood glucose levels in the 30s (mg/dL) should be managed with oral feeding (breast milk or formula). Repeat blood glucose should be measured 1 hour after the start of the feeding. If the glucose level does not rise, IV glucose infusions may be required. The early introduction of milk feeding is preferable and will often result in raising glucose levels to normal, maintaining normal stable levels, and avoiding problems with rebound hypoglycemia.
2. **Breastfeeding.** Breastfed infants have lower glucose levels but higher ketone body levels than those who are formula fed. Breast milk promotes ketogenesis, which is an alternate fluel for the brain. Early breastfeeding enhances gluconeogenesis and increases the production of gluconeogenic precursors.
3. **Dextrose gel.** In 2013, the Sugar Babies study demonstrated that use of 40% dextrose gel administration to treat mild hypoglycemia in infants at risk for hypoglycemia decreased NICU admissions for hypoglycemia and led to lower formula feeding rates at 2 weeks of life. Some units are incorporating dextrose gel into their hypoglycemia protocols.

4. IV therapy

a) Indications

i. Inability to tolerate oral feeding

ii. Persistent symptoms of hypoglycemia after feeding

iii. Oral feedings do not maintain normal glucose levels.

iv. Severe hypoglycemia

b) Urgent treatment: Symptomatic hypoglycemia including seizures, a bolus of 2 mL/kg of 10% dextrose infused intravenously

c) Continuing therapy : Infusion of glucose at a rate of 6 to 8 mg of glucose per kilogram per minute. Blood glucose should be checked after 30-60 min and then every 6 hour until blood sugar stabilized

Glucose infusion rate (GIR) may be calculated using the following formula

(a) Infusion rate = $\frac{\text{\% of dextrose being infused x rate (mL/hr)}}{\text{body weight (in kg) x 6}}$ (mg/kg/min)

(b) Infusion rate = $\frac{\text{IV rate (mL/kg/day) x \% of dextrose}}{144}$ (mg/kg/min)

(c) Infusion rate = Fluid rate (mL/kg/day) x 0.007 x % of dextrose infused

Resistant hypoglycemia[26]

It is a failure to maintain normal blood sugar levels despite a glucose infusion of 12 mg/kg/min or when stabilization is not achieved by 7 days of therapy**.**

Causes of Resistant hypoglycema	Investigation
Congenital hypopitutarism Adrenal insufficiency Hyperinsulinemic states Galactosemia Glycogen storage disorders Maple syrup urine disease Mitochondrial disorders Fatty acid oxidation defect	Serum insulin levels Serum cortisol levels Growth hormone levels Blood ammonia Blood lactate levels Urine ketones and reducing substances Free fatty acid levels Galactose 1 phosphate uridyl transferase levels

Neonatal hypoglycaemia and Neurodevelopmental outcome

Neurodevelopmental outcome in neonatal hypoglycaemia was first described by Cornblath et al in 1950 in a small group of symptomatic babies. A study reported 35 neonates who had symptomatic hypoglycemia showed that 94% of them had some white matter abnormalities and on follow up at 18 months of age, 65% demonstrated some impairment in development[27]

The duration, severity or number of episodes of hypoglycaemia required to cause neurodevelopmental impairment remains unclear. Consequences of hypoglycemia may present as cognitive delay, motor delay, refractory epilepsy and seizure, microcephaly, ataxia, visual impairment and learning disability[28]

There are various studies conducted about blood glucose level in term and late preterm neonates

Arunkumar de et el, studied Study of blood glucose level in normal and low birth weight newborns and impact of early breast feeding in a tertiary care centre and observed overall incidence of hypoglycemia was 32%. 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 breast feeding than early breast feeding (64% vs 17%; P<0.001).

Concluded: Low birth weight babies (both preterm and small-for-date) are prone to develop hypoglycemia especially in first 24 h of life with delayed introduction of breast feeding being an additional risk.[29]

Yerramilli murty vss et el, studied about pattern of blood sugar levels in low birth weight babies who are exclusively on breast milk and observed Blood sugar levels were studied in 100 LBW (2500g and below) neonates at 0, 1, 3, 6, 12, and 24h of life on the first day and eighth hourly on day two and day three of life. There were 70 term IUGR neonates and 30 were preterm. All the preterm neonates were AGA and none of them were SGA. Out of the total 100 cases, 56 were female and 44 were male. In the term IUGR neonates, there was a steady increase in the blood sugar levels over the first 3 days of life. In the present study there were four cases of hypoglycemia on the first day of life. Two cases of hypoglycemia occurred at 3rd hour of life and another at 6th hour of life and the fourth at 24 hours of life. Laboratory confirmation of the low blood sugar level was made in all the four cases. All the neonates were asymptomatic for hypoglycemia during the first 24 hours of life. Thus the incidence of asymptomatic hypoglycemia in this study was 5.7% in term IUGR babies. There was no case of symptomatic hypoglycemia that occurred in this group in this study. In the preterm group in the present study, mean blood sugar level

increase over the first 72 hours was seen. But the increase in blood sugar was not uniformly progressive. In our study, the incidence of hypoglycemia was 3.33% in the preterm group. All the babies in this group were AGA. An analysis of the results obtained in the present study revealed that all LBW neonates maintained adequate blood sugar levels during the first 72 hours of life with breast milk irrespective of gestational age and birth weight studied. Single episode of hypoglycemia occurred in 5% of these LBW babies, which was asymptomatic, thus making blood sugar monitoring essential in LBW babies in the first 24 hours of life.

The present study revealed that 95% of LBW neonates maintained adequate blood sugar levels during the first 72 hours of life with breast milk irrespective of gestational age and birth weight studied. Single episode of hypoglycemia occurred in 5% of these LBW babies.

Conclusions: There is a very low incidence of hypoglycemia in LBW newborn babies (including intrauterine growth retardation (IUGR) and preterm babies) on exclusive breast feeds. Breast milk is optimal feed in these LBW babies[30]

Orhideja Stomnaroska et el, studied about neonatal hypoglycemia: risk factors and outcomes and observed, investigated 84 patients (M:F=35:48) born at the University Clinic for Gynecology and Obstetrics in Skopje (hospitalized in the NICU) who were found to have hypoglycemia. In total 89.25% of the babies were premature. The mean birth weight was 1795.95 +/596.08 grams, the mean birth length was 41.92+/- 4.62 cm, while the mean gestational age was 33.05±3.19 weeks. 32 children (38.08%) were very low birth weight (4000 g). HG duration was 2.42+/-2.41 hours. In the group as a whole, hypoxic-ischemic encephalopathy (HIE) was found in 3 children (3.57%), infections in 22 (26.18%), respiratory distress syndrome (RDS) in

9 patients (10.62%), intracranial hemorrhage in 2 patients (2.38%). There were no inborn errors of metabolism. There were two deaths (2.38%).

Concluded: Neonatal HG is a significant factor in the overall neonatal mortality. HG can also cause severe invalidity. We found that infections, LBW and low gestational age were most commonly associated with neonatal HG. However the Spearman test showed weak direct correlation, without statistical significance. Neonatal HG requires complex and team interaction of prenatal and postnatal approaches to reduce the incidence of seizures, their consequences and the overall mortality. Special consideration is to be taken in measures that avoid neonatal infections, HIE, LBW and low gestational age. Further studies on a larger population are needed to fully understand and prevent the phenomenon of HG in newborns[31]

Muhammad Afzal, et el, studied glucose levels in late preterm and term newborns at one hour of life and frequency of hypoglycemia Two hundred and seventy newborns were selected by consecutive purposive non probability sampling who were born at QIH either by spontaneous vaginal delivery or cesarean section and observed Thirty (11%) babies showed sugar level < 30 mg/dl at 1 hour of life. Out of them 18(60%) were late preterm and 12(40%) were term babies. Out of them 12(40%) babies weighed <2kg, 8(26%) were between 2-2.5kg and 6(20%) were 2.5-4.0 kg while 4(14%) babies were between 4.0 to 4.6 kg. Only 6(2.2%) newborns became symptomatic with low sugar level. Among symptomatic neonates, 4 mothers had gestational diabetes and other two were with pregnancy induced hypertension (PIH). Important risk factors were gestational diabetes, PIH, fetal distress and SGA babies. Safest lower glucose level was found to be 30 mg/dl at 1 hour after birth.

Conclusion: Plasma glucose levels measured at 1 hour of life in late preterm and term newborns in our population are consistent with international studies. Frequency of symptomatic hypoglycemia is quite low and normal newborns [32]

Study done by Dorina Rodica Burdan, Valentin Botiu, Doina Teodorescu suggested that newborns with low body weight are at the greater risk of hypoglycemia. From all neonates with neonatal hypoglycemia, the neonates at term represent 45.53%, the preterm infants represent 52.84%, and the post term infants represent 1.63%. The preterm infants are at greater risk of neonatal hypoglycemia in this study.[33]

De AK, Biswas R, Samanta M, Kundu CK in a Study of blood glucose level in normal and low birth weight newborns and impact of early breast feeding in a tertiary care centre found that overall incidence of hypoglycemia was 32%. 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 breast feeding than early breast feeding (64% *vs* 17%; P<0.001)[i].[34]

Chertok et al in a study found that early breastfeeding may facilitate glycaemic stability in infants. The study also compared the glycaemic levels of infants who breastfed with those who received formula for their first feed. Results: Infants who were breastfed in the delivery room had a significantly lower rate of borderline hypoglycaemia than those who were not breastfed in the early postpartum period (10% versus 28%; Fisher's exact test., P = 0.05,). Likewise, infants breastfed in the delivery room had significantly higher mean blood glucose level compared to infants who were not breastfed in the delivery room (3.17 versus 2.86 mmol L-1, P = 0.03)[35]

Bhat et al in a study found that incidence of hypoglycaemia 25.2% in SGA groups. Among them 23.9% term sga and 28.5% preterm SGA.However in preter SGA groups , the incidence was 50% in those birth wt less than 2sd vs 22% in those birth weight between 1-2 SD. In asymmetrically growth retarded babies the incidence was 25.54% as against 20% in symmertrically growth retarded ones[36]

Saini et al in a study on low birth weight neonates found that out of 50 low birth weight neonates 12(24%) had one or more episode of hypoglycaemia. 75% hypoglycaemia recorded in first 24 hours and 25% between 49-72 hours . All the episodes were asymptomatic .Out of 12 hypoglycaemic neonates 7(58.3%) were SGA and 5(41.7%) were AGA. Pattern of blood glucose levels was significantly different among hypoglycaemic babies and normoglycemic babies over first 72 hours.[37]

C.D.Dhananjayaa, B.Kiran done a study on various high risk group babies, found that 60% hypoglycemias were asymptomatic and 40% were symptomatic. Male & female ratio 57.9% and 42.1 %respectively. Among the preterm babies, the incidences of hypoglycemia were highest in preterm with SGA (small for gestational age). Among the term babies, the incidence of hypoglycemia was more among LGA (large for gestational age) babies.

Taking all preterm, term and post term babies together the incidence of hypoglycemia was more in large for date babies 22.22%. The overall incidence of hypoglycemia was 4.2% in that study. In the present study 21 cases (55.26%) presented hypoglycemia on day 2, 10 cases (26.31%) on day 1 and 37 cases (18.42%) on day3.[38]

Study done by Atrushi MA on Frequency and risk factors of hypoglycaemia in neonatal Nursery in Duhok found thathat among 342 neonates 17.78% had hypoglycaemia. The age of hypoglycaemia is 1-2 days in 83.65 (n=51) p=0.075. Of

hypoglycemics 19.6% (n=12) were premature p=0.041. Low birth weight was seen in 29.5% (n=18) of hypoglycaemic neonate. Large birth weight was seen in 11.47% (n=7) p=0.031. Of hypoglycaemic 13.11% had low o2 saturation. Only 22.95% started oral feeding p=0.13.[39]

Study done by Kanagagiri R et al on 'Incidence of Hypoglycemia in High Risk Neonates and Its Relationship with Gestational Age Birth Weight and Ponderal Index' found that the total incidence of hypoglycemia in neonates at risk is 16.5% and the incidence of hypoglycemia in babies with gestational age <37 weeks was 21% and with gestational age >37 weeks was 8%. The incidence of hypoglycemia in babies with birth weight <2.5kg was 23 % and with birth weight >2.5 kg was 9%. The incidence of hypoglycemia in babies who are SGA was 21 % and in babies who are AGA was 8%.[40]

MATERIALS AND METHODS

Source of data:

Babies delivered in _____ _____ fulfilling the inclusion and exclusion criteria.

Study period: 18 Months

Study design : Prospective comparative analytical study.

Sample Size

With Anticipated common Proportion of between the two groups as **60%** and 40% [32] the minimum sample size per group is **98 patients** with **80% power and 5% level of significance**.

Formula used

- $\mathbf{n = \frac{(z_\alpha + z_\beta)^2\ 2\ p*q}{MD^2}}$

Where Z= Z statistic at a level of significance

MD= Anticipated difference between two proportions

P=Common Proportion

q= 100-p

Inclusion criteria:

Neonates of 34-40 weeks of gestational age delivered in _____ _____

Exclusion criteria

Syndromic babies

Neonates with history of prelacteal feeds

Neonates whose mother not giving consent to study

Methods of collection of data :

In this prospective comparative analytical study, a convenient sample of 196 neonates of 32-40 gestational age delivered in _____ _____ who do not require NICU admission and are kept in postnatal wards with mother will be included.

The birth weight percentiles were adopted from the Fenton growth chart. Infants requiring NICU admission or those having major congenital malformations were excluded. The study was approved by institutional ethical committee. Parents were explained about baby's risk for hypoglycemia and consent for blood tests at regular intervals was obtained. All the details of the newborn and mother were noted in a proforma at the time of enrolment. Counseling as well as assistance for exclusive breastfeeding was done in all cases and breastfeeding was ensured within 30 minutes of birth in vaginal delivery as well as in caesarean section, and thereafter every 2 to 3 hrs, including at least two nighttime feeds. Blood glucose was checked by Glucometer at 1,2, 6, 24, and 48 hrs of life or whenever clinical features suggestive of hypoglycaemia, using glucometer strips.

Newborns developing asymptomatic hypoglycemia (25-45 mg/dL) were breastfed, and repeat blood glucose level was determined after 1 hr; if blood glucose in the range of 40-45mg/dL, baby was breastfed again and advised increased frequency of feeding, or increased volume if baby was given expressed breast milk (EBM).

If blood glucose level is < 45 mg/dl, sample will be collected for Laboratory evaluation of RBS.

Baby was admitted the NICU and treated with intravenous dextrose as per standard protocols, if the symptomatic hypoglycemia occurred at any time

Study Tools:

a) Glucometer (Accu-chek, Mannheim, Germany)

b) Sterile needle

c) Dry cotton / sterile swab

d) Sodium fluoride vacutainer

Birth Weight:

Weight of the newborn after birth was recorded without clothing accurately on an electronic type of weighing scale. The weighing scale was corrected for any zero error before measurement.

Small for gestational Age: weight falls below 10 th percentile for the period of gestation

Large for gestational Age: Birth weight more than 90 th percentile for the period of gestation

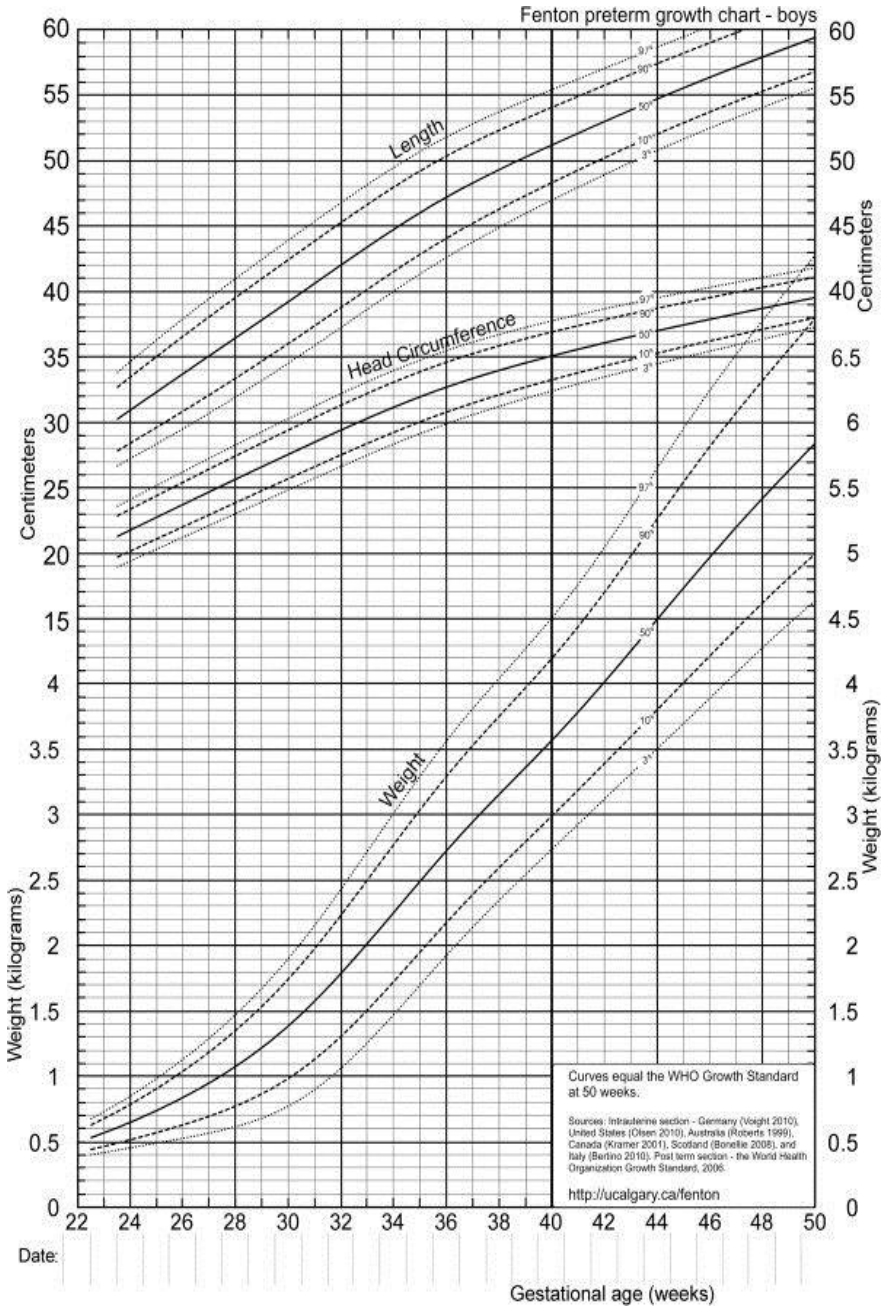


Figure no 3: fenton growth chart

Length:

Length was recorded by a Infantometer. Length was recorded only in case of SGA babies. The newborn lies comfortably on the infantometer with head against the head plate, back straight on the infantometer, knees straightened and foot positioned vertically against the foot plate

Gestational Age:

Gestational age was calculated by adding 280 days to the first day of last menstrual period

Random blood glucose by Glucometer[41,42]

Test principle: Glucose Dehydrogenase in the strip converts the glucose in the blood sample to gluconolacton. This reaction creates a harmless electrical current that the glucometer interprets for that blood glucose

Procedure:

Before pricking, wash hands thoroughly and pre-warm the sole to ensure good perfusion. Use a sterile needle to prick the child. Touch a drop of blood to the front edge of the yellow window of the test strip. Do not put blood on top of the test strip Blood will be drawn into the strip automatically. Test result will appear within 30 sec.

Laboratory diagnosis:

This is the most accurate method. In the laboratory (lab), glucose can be measured by either the glucose oxidase (calorimetric) method or by the glucose electrode method (as used in blood gas and electrolyte analyzer machine). Blood samples should be analyzed quickly to avoid erroneously low glucose levels

PRINCIPLE:

Enzymatic calorimetric test, GOD-POD i.e. glucose oxidase- peroxidase method.

- Glucose + O2----------Gluconic acid + H2O2
- H2O2 + 4-Aminoantipyrine + Phenol----------Chinomine + 4H2O2

The first step is catalyzed by glucose oxidase and the second by peroxidase enzyme

OBSERVATIONS AND RESULTS

DATA COLLECTION:

In this prospective comparative analytical study, a convenient sample of 196 neonates of 32-40 gestational age delivered in _____ _____ who do not require NICU admission and are kept in postnatal wards with mother will be included.

The birth weight percentiles were adopted from the Fenton growth chart. Infants requiring NICU admission or those having major congenital malformations were excluded. The study was approved by institutional ethical committee. Parents were explained about baby's risk for hypoglycaemia and consent for blood tests at regular intervals was obtained. All the details of the newborn and mother were noted in a proforma at the time of enrolment. Counseling as well as assistance for exclusive breastfeeding was done in all cases and breastfeeding was ensured within 30 minutes of birth in vaginal delivery as well as in caesarean section, and thereafter every 2 to 3 hrs, including at least two nighttime feeds. Blood glucose was checked by Glucometer at 1, 2, 6, 24, and 48 Hrs of life or whenever clinical features suggestive of hypoglycaemia, using glucometer strips.

Newborns developing asymptomatic hypoglycemia (25-45 mg/dL) were breastfed, and repeat blood glucose level was determined after 1 hr; if blood glucose in the range of 40-45mg/dL, baby was breastfed again and advised increased frequency of feeding, or increased volume if baby was given expressed breast milk (EBM).

If blood glucose level is < 45 mg/dl, sample will be collected for Laboratory evaluation of RBS.

Baby was admitted the NICU and treated with intravenous dextrose as per standard protocols, if the symptomatic hypoglycemia occurred at any time.

Statistical analysis

All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean± standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Chi-square (χ^2) test was used for association between two categorical variables. The difference of the means of analysis variables between two groups was tested by unpaired t test. If the p-value was < 0.05, then the results were considered to be statistically significant otherwise it was considered as not statistically significant. Data were analyzed using SPSS software v.23.0. and Microsoft office 2007.

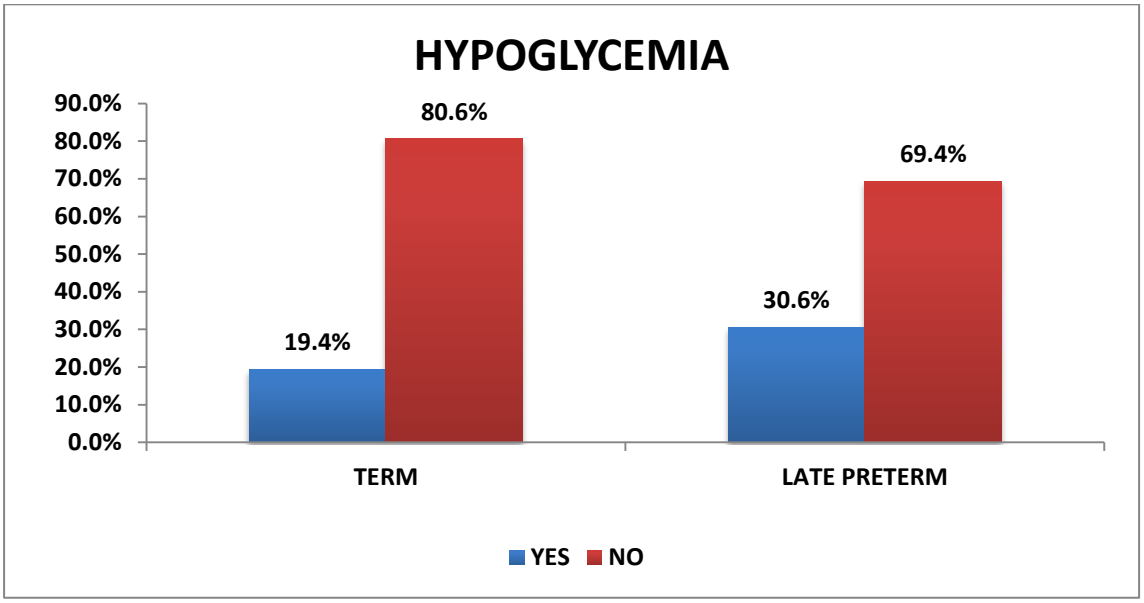
RESULT ANALYSIS:

A total of 196 newborns were enrolled for the study after due written consent from parents with 98 newborns in each study groups.

TABLE 2: DISTRIBUTION OF HYPOGLYCEMIA BETWEEN STUDY GROUPS

HYPOGLYCEMIA	TERM		LATE PRETERM		p value
	N	%	N	%	
YES	19	19.4%	30	30.6%	0.070
NO	79	80.6%	68	69.4%	
Total	98	100.0%	98	100.0%	

FIGURE 4: DISTRIBUTION OF HYPOGLYCEMIA BETWEEN STUDY GROUPS

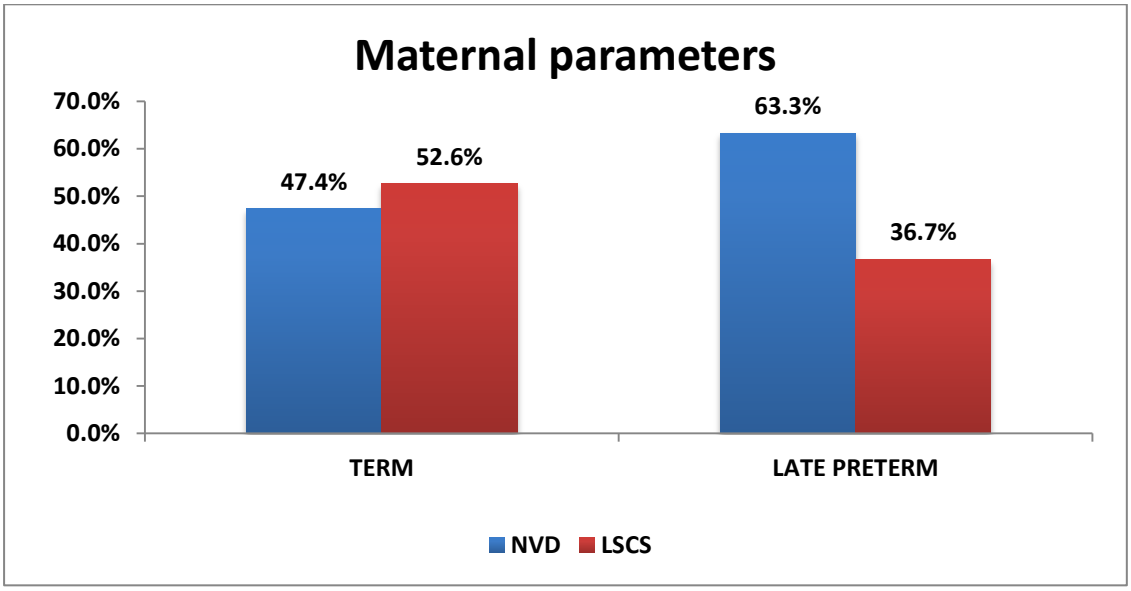


Out of 98 term newborns 19(19.4%) developed hypoglycaemia and out 98 late preterm newborns 30(30.4%) developed hypoglycaemia. Late preterm neonates had greater incidence of hypoglycemia than their term counterparts (p=0.070)

TABLE 3: DISTRIBUTION OF MATERNAL PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

MATERNAL PARAMETERS	TERM		LATE PRETERM		p value
	N	%	N	%	
NVD	9	47.4%	19	63.3%	0.271
LSCS	10	52.6%	11	36.7%	
Total	19	100.0%	30	100.0%	

FIGURE 5: DISTRIBUTION OF MATERNAL PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



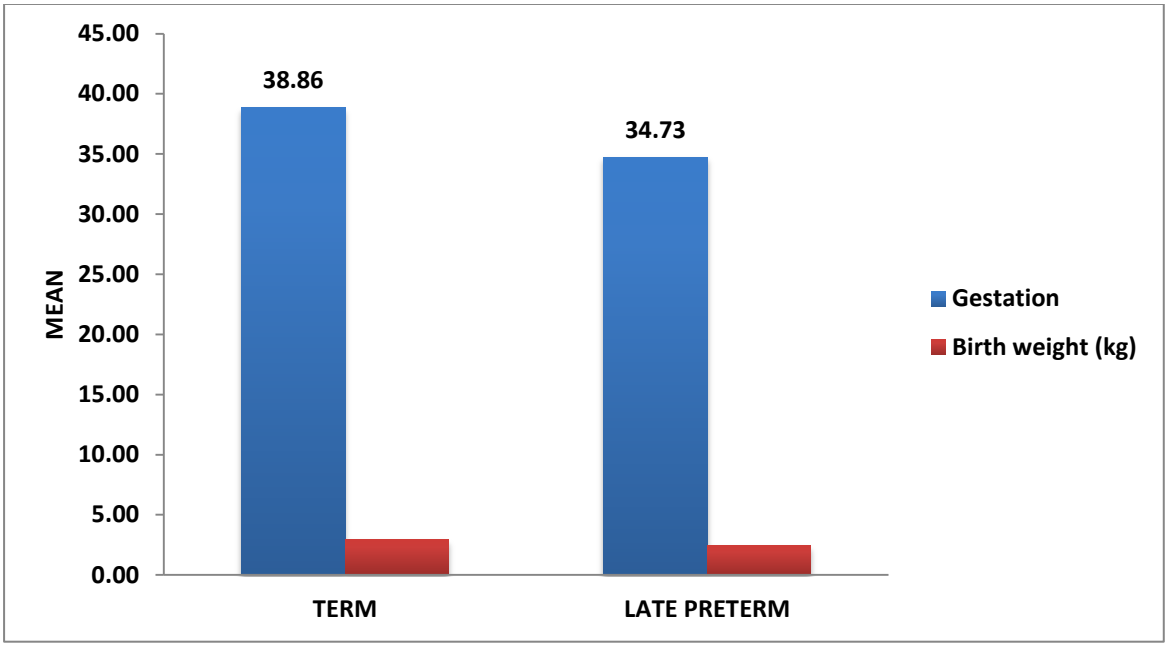
Among 19 term hypoglycaemic babies 9 and 10 babies delivered by NVD and LSCS respectively (47.4%, 52.6%). Among 30 late preterm babies 19 and 11 babies delivered by NVD and LSCS respectively (63.3%, 36.7%). (p=0.271)

TABLE 4: MEAN MATERNAL PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

PARAMATERS	TERM		LATE PRETERM		p value
	Mean	SD	Mean	SD	
Gestation	38.86	0.64	34.73	6.59	0.009*
Birth weight (kg)	2.95	0.70	2.43	0.39	0.002*

Note: * significant at 5% level of significance (p<0.05)

FIGURE 6: MEAN MATERNAL PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

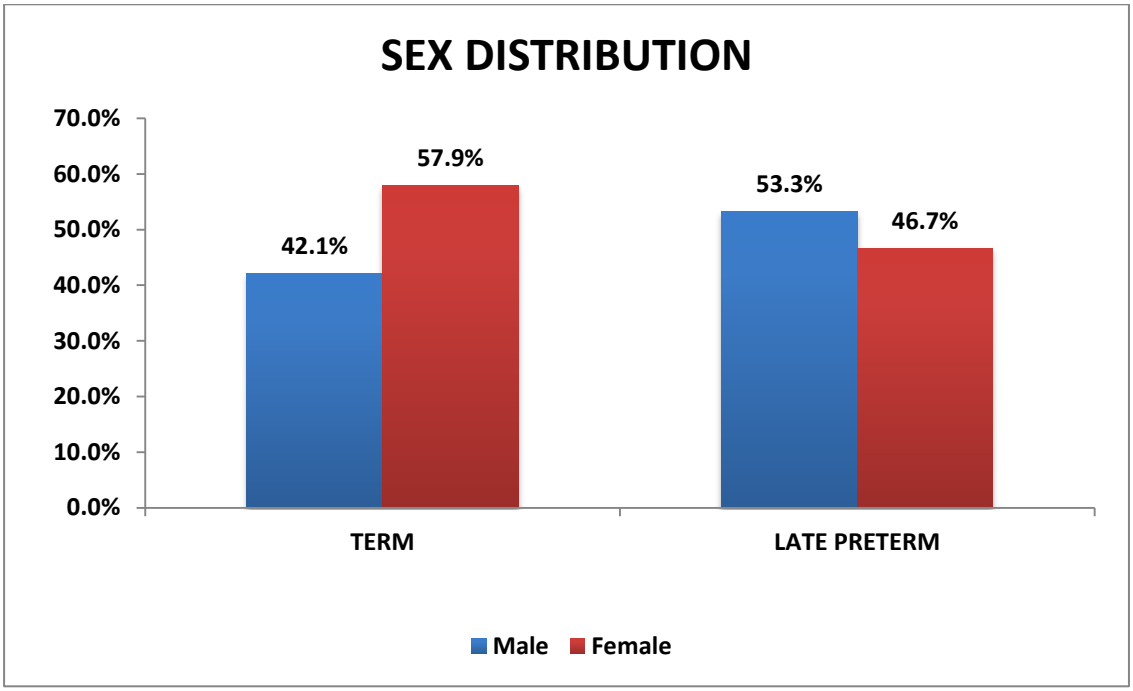


Median birth weight was 2.95kg and 2.43kg in term and late preterm babies respectively (p=0.002), which is statistically significant. Median gestational age was 38.86 and 34.73 in term and late preterm babies (p=0.009). Study revealed the risk hypoglycaemia is inversely proportional to birth weight and gestational age.

TABLE 5: DISTRIBUTION OF SEX OF CHILD BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

SEX	TERM		LATE PRETERM		p value
	N	%	N	%	
Male	8	42.1%	16	53.3%	0.444
Female	11	57.9%	14	46.7%	
Total	19	100.0%	30	100.0%	

FIGURE 7: DISTRIBUTION OF SEX OF CHILD BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



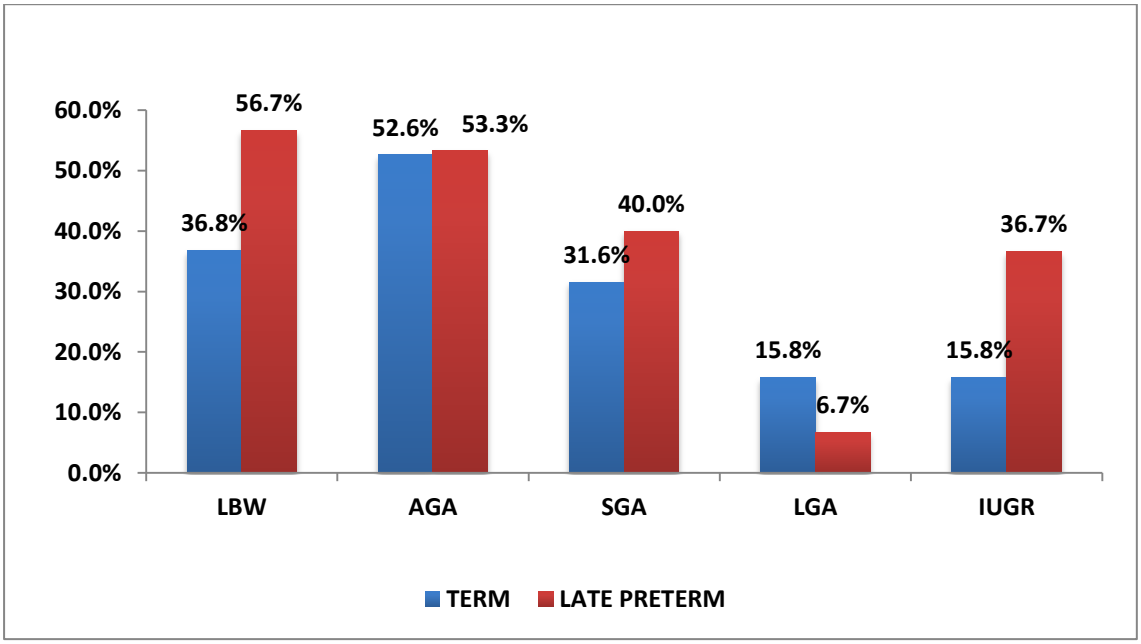
Among 19 term hypoglycaemic newborn, 8 (42.1%) were males and 11(57.9%) were females. Among 30 late preterm newborns 16(53.3%) were males and 14(46.7%) were females. (p=0.444)

TABLE 6: DISTRIBUTION OF PARAMATERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

Paramaters	TERM		LATE PRETERM		p value
	N	%	N	%	
LBW	7	36.8%	17	56.7%	0.040*
AGA	10	52.6%	16	53.3%	0.385
SGA	6	31.6%	12	40.0%	0.551
LGA	3	15.8%	2	6.7%	0.304
IUGR	3	15.8%	11	36.7%	0.115

Note: * significant at 5% level of significance (p<0.05)

FIGURE 8: DISTRIBUTION OF PARAMATERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



Among hypoglycaemic newborns in term (n=19) and late preterm (n=30), 7(36.8%) & 17(56.7%) were having birth weight less than 2.5kg (LBW) (p=0.040) which is statistically significant. Study showed LBW babies more prone for hypoglycaemia. 52.6% (n=10) term and 53.3% (16) late preterm hypoglycaemic

babies are AGA. 31.6% (n=6) term and 40.0% (n=12) late preterm hypoglycaemic babies are SGA.

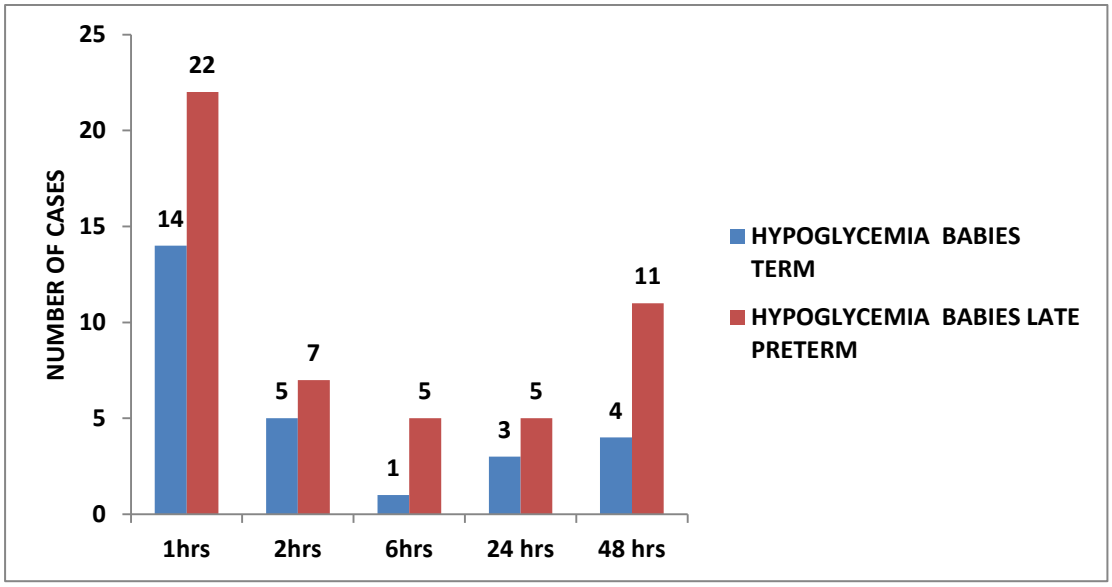
Among hypoglycaemic newborns in term and late preterm 15.8 %(n=3) & 6.7 %(n=2) are LGA respectively. 15.8 %(n=3) & 36.7% (n=11) are IUGR in term and late pre term hypoglycaemic babies.

Inference: there was no correlation between hypoglycaemia and AGA, SGA, LGA & IUGR

TABLE 7: HYPOGLYCEMIA BABIES BY HRS OF LIFE

HRS OF LIFE	HYPOGLYCEMIA BABIES		p value
	TERM	LATE PRETERM	
1hrs	14	22	0.140
2hrs	5	7	0.551
6hrs	1	5	0.097
24 hrs	3	5	0.470
48 hrs	4	11	0.060

FIGURE 9: HYPOGLYCEMIA BABIES BY HRS OF LIFE

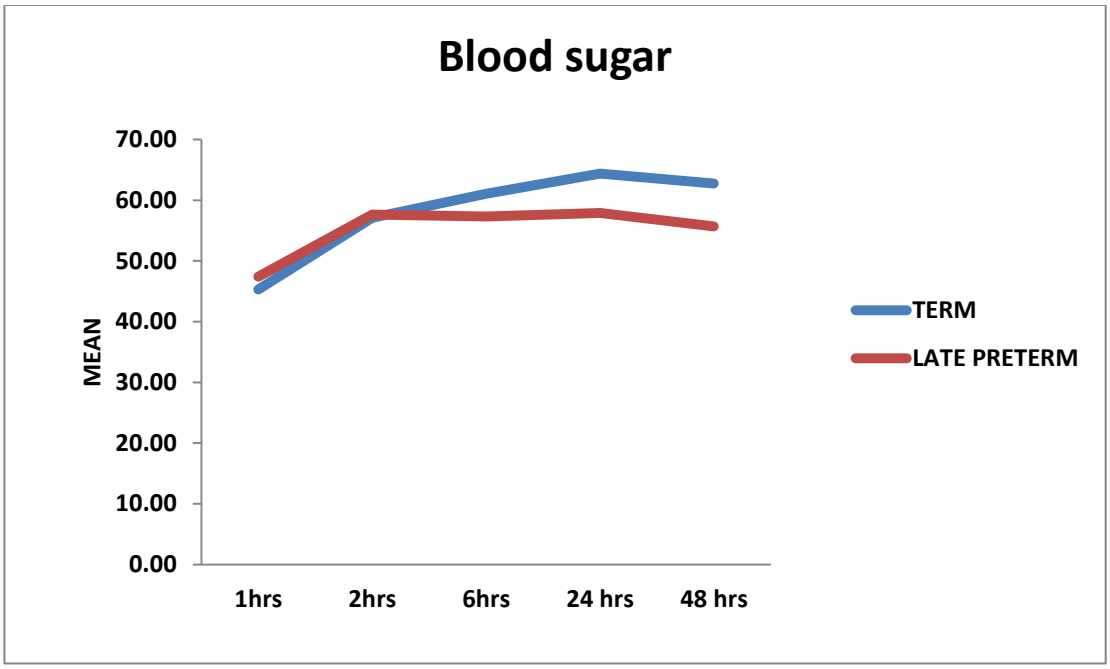


Most cases of hypoglycaemia occur at 1st hour life in term and late preterm babies

TABLE 8: MEAN BLOOD SUGAR LEVEL BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

Blood sugar	TERM		LATE PRETERM		p value
	Mean	SD	Mean	SD	
1hrs	45.32	17.70	47.40	14.69	0.657
2hrs	57.11	15.17	57.66	13.16	0.895
6hrs	61.05	11.87	57.30	9.75	0.234
24 hrs	64.37	14.54	57.90	10.58	0.078
48 hrs	62.74	13.39	55.70	12.38	0.067

FIGURE 10: MEAN BLOOD SUGAR LEVEL BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



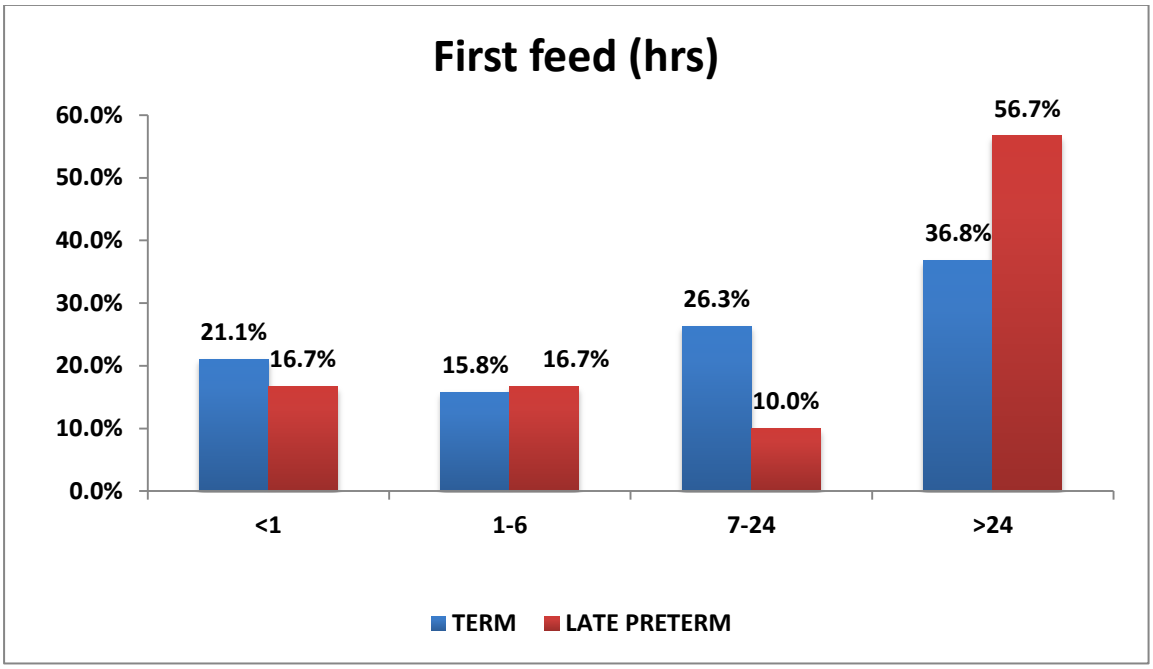
Mean blood sugar values at 1, 2, 6, 24 & 48 hours are 45.32, 57.11, 61.05, 64.37, and 62.74 respectively in term babies .Lowest values are observed in 1st hour of life.

In late preterm babies mean blood sugar values at 1, 2, 6, 24 & 48 hours are 47.40, 57.66, 57.30, 57.90 & 55.70 respectively. Lowest values are observed in 1st hour of life.

TABLE 9: DURATION OF FIRST FEED BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

First feed (hrs)	TERM		LATE PRETERM		p value
	N	%	N	%	
<1	4	21.1%	5	16.7%	0.398
1-6	3	15.8%	5	16.7%	
7-24	5	26.3%	3	10.0%	
>24	7	36.8%	17	56.7%	
Total	19	100.0%	30	100.0%	

FIGURE 11: DURATION OF FIRST FEED BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



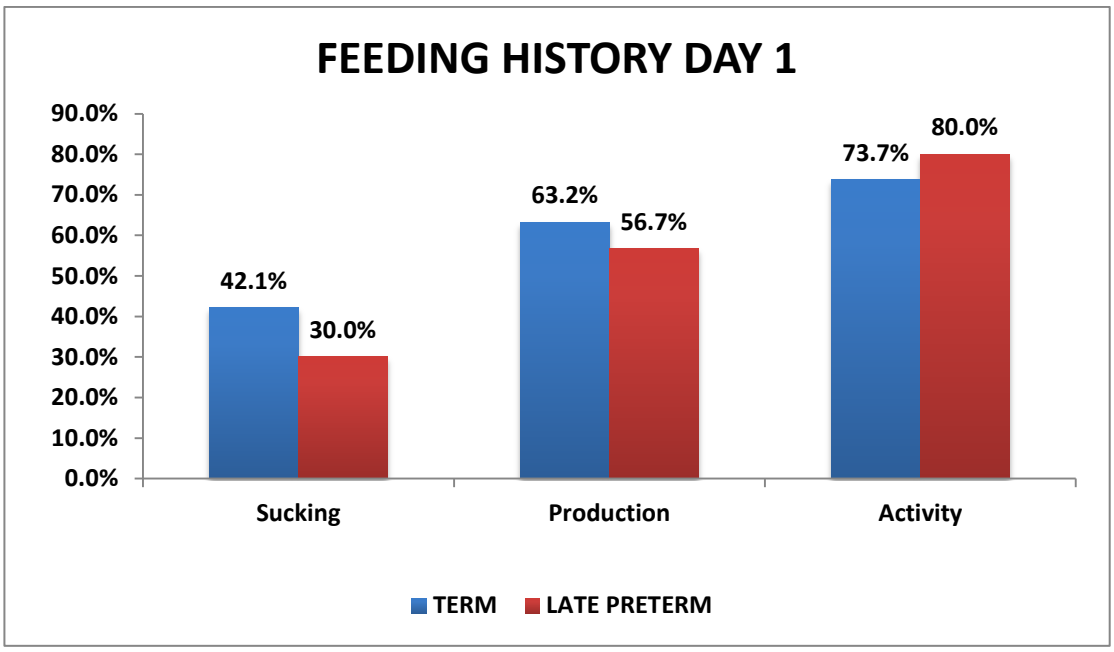
In hypoglycaemic babies 21.1 %(n=4) & 16.7 %(n=5) 0f mothers initiated feeds within 1 hour of life in term and late preterm babies respectively. In 15.8% and 26.3% term hypoglycaemic babies, feedings were initiated during 1

6 & 7-24 hours of life. Most of mothers, i.e.36.8% &56.7% initiated feeds after 24 hours in term and late preterm babies respectively.

TABLE 10: FEEDING HISTORY DAY 1 BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

FEEDING HISTORY DAY 1	TERM		LATE PRETERM		p value
	N	%	N	%	
Sucking	8	42.1%	9	30.0%	0.386
Production	12	63.2%	17	56.7%	0.652
Activity	14	73.7%	24	80.0%	0.606

FIGURE 12: FEEDING HISTORY DAY 1 BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



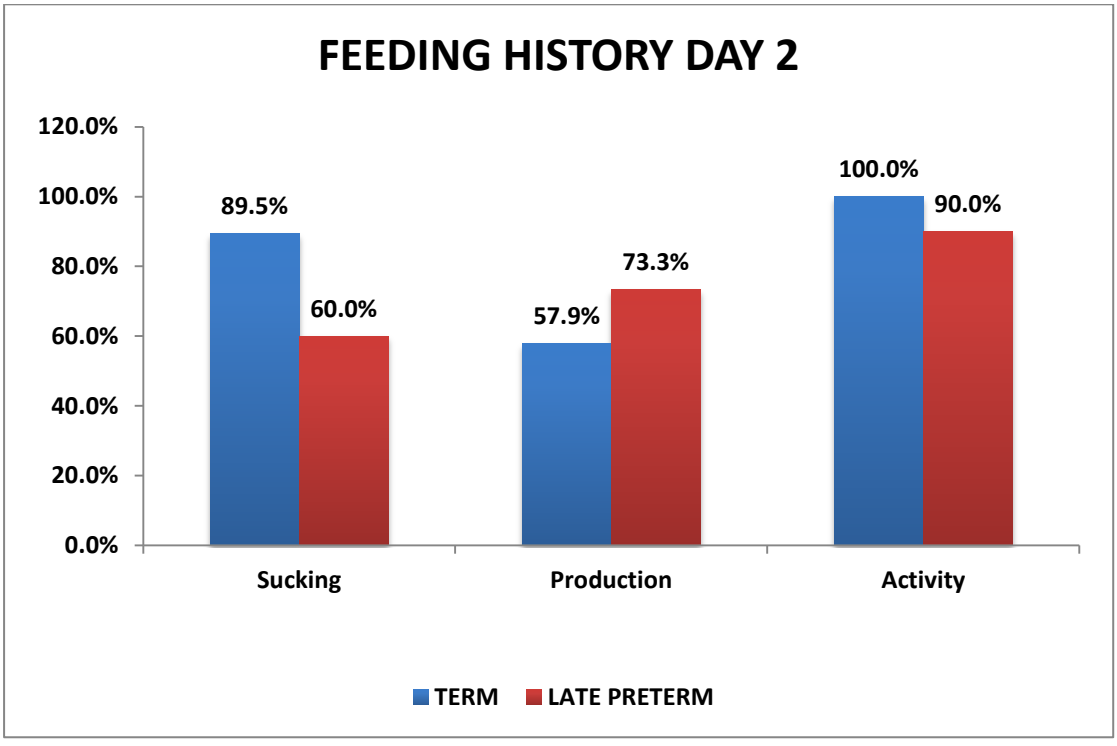
Among term hypoglycaemic babies most common complaint on first day by mother was decreased sucking, decreased milk production and reduced activity respectively. In late preterm hypoglycaemic babies most common complaint was same as term babies on first day.

TABLE 11: FEEDING HISTORY DAY 2 BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

FEEDING HISTORY DAY 2	TERM		LATE PRETERM		p value
	N	%	N	%	
Sucking	17	89.5%	18	60.0%	0.042*
Production	11	57.9%	22	73.3%	0.261
Activity	19	100%	27	90.0%	0.153

Note: * significant at 5% level of significance ($p<0.05$)

FIGURE 13: FEEDING HISTORY DAY 2 BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

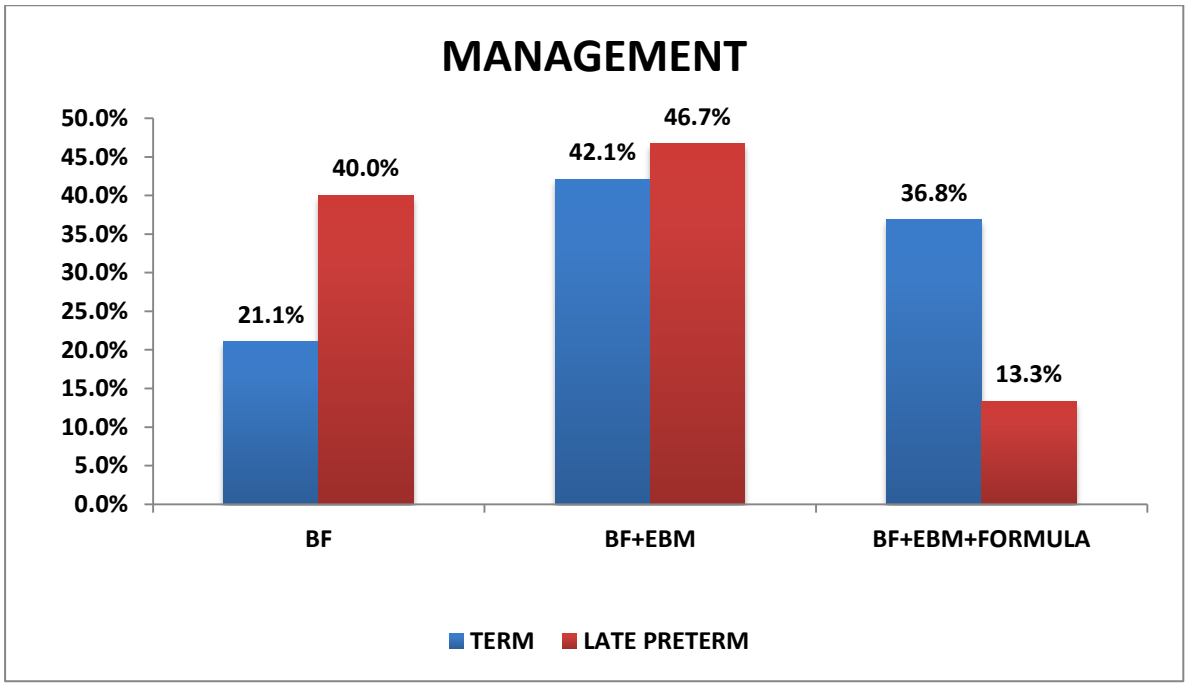


On 2nd day most common complaint was reduced production and poor sucking in term and late preterm babies respectively.

TABLE 12: MANAGEMENT OF HYPOGLYCEMIA BETWEEN STUDY GROUPS

MANAGEMENT	TERM		LATE PRETERM		p value
	N	%	N	%	
BF	4	21.1%	12	40.0%	0.123
BF+EBM	8	42.1%	14	46.7%	
BF+EBM+FORMULA	7	36.8%	4	13.3%	
Total	19	100.0%	30	100.0%	

FIGURE 14: MANAGEMENT OF HYPOGLYCEMIA BETWEEN STUDY GROUPS



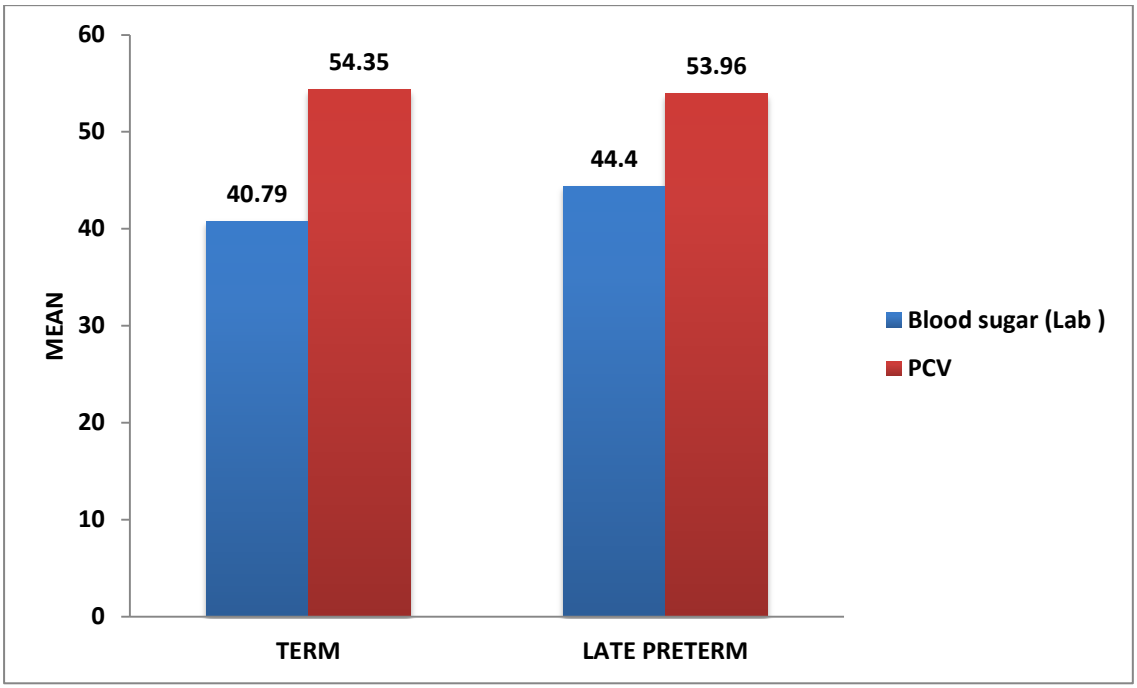
Most of hypoglycaemic babies were treated with breast feeding with expressed breast milk in term and late preterm babies

TABLE 13: MEAN LAB PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN

LAB PARAMETERS	TERM		LATE PRETERM		p value
	Mean	SD	Mean	SD	
Blood sugar (Lab)	40.79	5.721	44.4	6.123	0.045*
PCV	54.35	4.156	53.96	5.858	0.803

Note: * significant at 5% level of significance (p<0.05)

FIGURE 15: MEAN LAB PARAMETERS BETWEEN STUDY GROUPS AMONG HYPOGLYCEMIC CHILDREN



Mean laboratory blood sugar levels in term and late preterm babies were 40.79 & 44.4 respectively (p=0.045) which is statistically significant.

Mean PCV values among hypoglycaemic babies were 54.35 and 53.96 in term and late preterm babies respectively.

DISCUSSION

In the present study total 196 babies, 98 babies in each study group i.e. term and late preterm groups were screened for hypoglycemia out of which 19 term and 30 late preterm babies were hypoglycemic . Incidence of hypoglycemia among exclusively breastfed term and late preterm babies was 19.4% & 30.6% respectively. There is wide variation in reports of incidence of hypoglycaemia across the world. The incidence varies with the method of hypoglycaemia screening, frequency of screening and feeding practices. There is a paucity of data on the incidence of hypoglycaemia where exclusive breastfeeding policy is followed.

Kaiser et al reported incidence of hypoglycaemia of 19.3% in 1395 newborns with GA's between 23 and 42 weeks using a cut-off of <45 mg/dl, which was comparable to our study[43]. In a study conducted in Kenya, Osler[44] reported that 23% of neonates were hypoglycaemic; where as Dashti et al[45] reported 15.1% and Singh YP et al[46] reported 15.2% prevalence of hypoglycaemia, lower incidence than our study. In Tehran Shams et al[47] reported the frequency of hypoglycaemia as 3.5% and Dhananjaya et[38] al studied Clinical profile of hypoglycaemia in newborn babies in a rural hospital setting and reported incidence of hypoglycaemia 4.2%, which is much lower than this study.

In other study *Kumar TJ et al[11] reported* incidence of hypoglycaemia in newborns with risk factors was 33.3%. Out of 1883 Babies born with risk factors, 627 Babies developed at least one episode of hypoglycaemia. In Singh et al study incidence of hypoglycaemia in risk infant reported to be 27%[48] and 29.3% in Khan et al[49] Study.

In this study Preterm gestation and low birth weight babies were significantly associated with hypoglycemia.

The incidence of hypoglycaemia in late preterm babies was 30.6%, which is comparable with Singh et al study. In Singh et al the incidence of hypoglycaemia in late preterm infants was 36.9%. . Kumar TJ et al. reported incidence of hypoglycemia in preterm newborns was 33.3%[11].

The incidence of hypoglycaemia was 30.76% in SGA, which is higher than that with the Holtrop et al reports. In Holtrop et al the frequency of hypoglycaemia in SGA infants was 14.7%[50]. In Bhat et al study, the incidence of hypoglycemia was 25.2% in SGA babies. De et al study showed incidence of hypoglycemia in SGA was 64.2%, but the population size was very small.

In study done by Muhammad Afzal, et el, found incidence of hypoglycaemia was 11% out of them 40% were term and 60% were late preterm[32] which was higher than our study. In our study incidence of hypoglycaemia in term and late preterm babies were 19.4% & 30.6%.

Yerramilli and Kethireddi found incidence of hypoglycaemia in term IUGR babies was 5.7%[30] which is lower than our study. Incidence of hypoglycaemia in term IUGR babies in our study was 15.8%.

The frequency of hypoglycemia in LGA infants was 5% in Holtrop et al study, 14.6 % in Singh et al study. The incidence of hypoglycemia in LGA in this study was 6.7%. This nearly consistent with the study done by, Holtrop et al where the result was 5%.

Symptomatic hypoglycaemia should be treated with parenteral continuous glucose infusion. Breastfeeding is the initial management of asymptomatic hypoglycaemia. Different units follow different protocols for management of asymptomatic hypoglycaemia. Many units resort to give sugar fortified feeds or

supplementary formula feeds. The incidence of hypoglycaemia varies according to the protocols and feeding methods.

In this study, almost maximum hypoglycaemia was detected at 1 hour of life and rest of the hypoglycaemia followed by 2, 48, 24 & 6 hours respectively in term babies and 48, 2, 6 & 24 hours in late preterm babies.

CONCLUSION

The incidence of hypoglycaemia in healthy newborns on exclusive breastfeeding was 19.4% & 30.6% in term and late preterm babies respectively. Hypoglycemia was seen in 36.8% & 56.7% in term and late preterm LBW babies, 31.6% & 40.0% of SGA, 15.8% & 6.7% of LGA, About 14 & 22 of newborns developed hypoglycaemia at 1 hour of life, 5 & 7 at 2 hours of life, 1 & 5 at 6 hours, 3 & 5 at 24 hours, 4 & 11 at 48 hrs of life. We conclude that healthy newborns in postnatal wards can be exclusively breastfed, but there is need to closely monitor their blood glucose levels at least in first 48 hrs to prevent hypoglycaemia and potential neurodevelopment damage, and asymptomatic hypoglycemia in newborns can be managed with frequent breastfeeds.So more studies with larger sample size are required to see the association between these risk factors and hypoglycemia. Also more studies with long-term follow up are required to evaluate impact of this asymptomatic hypoglycemia on this population.

RECOMMENDATIONS

In our study, hypoglycaemia significantly associated with late preterm and low birth weight babies. Identification of Antenatal risk factors & stratification of high risk neonates is required. Blood glucose screening of high risk neonates to be done to detect asymptomatic hypoglycaemia. As most of the hypoglycaemia occurs in 1st 2hrs, breastfeeding should be initiated as soon possible preferably within 1 hour of birth. As our study population size was not large enough to detect association between hypoglycaemia and SGA, LGA & IUGR, study with larger sample size or multicentric study trial to be done to strengthen the study results. Some studies have reported that long term neurological sequel may be seen to the extent of 35 % of newborns with symptomatic hypoglycaemia and up to 20% in those with asymptomatic hypoglycaemia, Hence regular follow up of these hypoglycaemic neonate should be continued to detect any neurodevelopment adverse outcome.

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ANNEXURE I

ETHICAL CLEARANCE CETIFICATE

ANNEXURE II

SCREENING FOR HYPOGLYCAEMIA IN LATE PRETRM AND TERM NEONATES

PURPOSE OF RESEARCH:

I have been informed that this study will help in early detection of neonatal hypoglycaemia and prevention of long term neurological sequelae

PROCEDURE:

I am aware that in addition to routine care received, I will be asked series of questions by the investigator. I have been asked to undergo the necessary investigations which will help the investigator in this study

BENEFITS:

I understand that participation in the study will help the investigator to help in the early detection of neonatal hypoglycemia and early treatment.

CONFIDENTIALITY:

I understand that the medical information produced by this study will become a part of hospital records and will be subject to the confidentiality. Information of sensitive personal nature will not be part of the medical record, but will be stored in the investigations research file.

If the data are used for publication in the medical literature or for teaching purpose, no name will be used and other identifiers such as photographs will be used only with special written permission. I understand that I may see the photograph before giving the permission.

REQUEST FOR MORE INFORMATION:

I understand that I may ask more questions about the study at any time; at the department of pediatrics is available to answer my questions or concerns. I understand that I will be informed of any significant new findings discovered during the course of the study, which might influence my continued participation. A copy of this consent form will be given to me to keep for careful reading.

REFUSAL FOR WITHDRAWAL OF PARTICIPATION:

I understand that my participation is voluntary and that I may refuse to participate or may withdraw consent and discontinue participation in the study at any time without prejudice. I also understand that may terminate my participation in the study after he has explained the reasons for doing so.

INJURY STATEMENT:

I understand that in the unlikely event of injury to the baby resulting directly from participation in this study, if such injury were reported promptly, the appropriate treatment would be available to the baby. But, no further compensation would be provided by the hospital. I understand that by my agreements to participate in this study and not waiving any of my legal rights.

I have explained to _____the purpose of the research, the procedures required and the possible risks to the best of my ability.

_____ _____

Date

(Investigator)

PARENTS / GUARDIAN CONSENT STATEMENT:

We confirm that is doing a study on screening of hypoglycaemia in neonates of 32-40 weeks gestation, has explained to us the purpose of research and the study procedure. We are willing to allow our baby to undergo investigations and the possible discomforts as well as benefits. We have been explained all the above in detail in our own language and we understand the same. Therefore we agree to give consent for our baby to participate as a subject in this research project.

_____ _____

(Parents / Guardian) Date

_____ _____

(Witness to signature) Date

ANNEXURE- III

PROFORMA

Name :

Sex : IP NO :

Religion : DOB :

Postal address: DOD :

Age of the mother :

Antenatal registration (Yes/No):

Obstetrics history :

Gestational age :

Mode of delivery (Normal vaginal/Caesarean/Forceps/Vacum):

APGAR score :

Ponderal index:

Age in hours of first feed:

Feeding h/o (lactation):

	Baby sucking (Yes/no)	Milk production (yes/no)	Cry/activity/tone
Day 1			
Day 2			

GENERAL PHYSICAL EXAMINATION:

Birth weight…….gm

HR : RR : HC :

CFT : TEMP: LENGTH:

SYSTEMIC EXAMINATION:

CVS:

RESPIRATORY SYSTEM:

GASTRO – INTESTINAL SYSTEM:

CNS:

Hour since birth	Temperature	GRBS	Lab investigation (if any)
1 hour			
2 hours			
6 hours			
24 hours			
48 hours			

DIAGNOSIS:

ANNEXURE- IV

KEY TO MASTER CHART

NVD Normal vaginal delivery

LSCS Lower segment caesarean section

DOB Date of birth

TOB Time of birth

LBW Low birth weight

AGA Appropriate for gestational age

SGA Small for gestational age

LGA Large for gestational age

IUGR Intrauterine growth restriction

PCV Packed cell volume

MASTER CHART

SL NO	IP NO	Patient data	maternal data								LBW	AGA	SGA	LGA	IUGR	First feed (hrs)	Feeding history Day 1			Feeding history Day 2			blood sugar					HYPOGLYCEMIA	symptoms	management	Blood sugar (Lab)	PCV
			age	gestation	NVD	LSCS	DOB	TOB	SEX	Birth wt.							sucking	production	activity	sucking	production	activity	1hrs	2hrs	6hrs	24 hrs	48 hrs					
1	256	B/O Pallavi V Sutar	26	34.3	Y	N	1/2/2018	2145	F	2.41	y	N	N	N	N	>24	Y	Y	Y	Y	Y	Y	45	50	72	72	58					
2	1075	B/O Laxmi B Yaranal	22	36.4	N	Y	1/9/2018	1721	F	2.21	Y	N	Y	N	N	>24	N	N	Y	N	N	Y	66	61	75	69	59					
3	1113	B/O Jayashree	35	34	Y	N	1/10/2018	958	F	2.71	N	N	N	Y	N	4	Y	Y	Y	Y	Y	Y	57	63	39	56	89	Y	ASYMP	Breastfeeding+ EBM	42	56.4
4	2301	B/O Shobha N Bagalkot	24	34.6	Y	N	1/19/2018	1114	F	2.178	Y	N	Y	N	N	>24	N	N	Y	Y	N	Y	59	73	77	89	69					
5	2600	B/O Sharanamma A Shapet	24	34.6	Y	N	1/21/2018	1841	F	2.25	Y	N	N	Y	N	8	N	N	N	N	Y	Y	61	71	67	49	53					
6	3120	B/O Vijayalaxmi Y Chinchodi	22	35.5	Y	N	1/25/2018	1827	M	1.66	Y	N	N	Y	Y	>24	N	Y	Y	Y	N	N	45	72	80	91	73					
7	4402	B/O Heena kousar Chattaraki	22	35.5	Y	N	2/5/2018	1150	F	2.06	Y	N	N	Y	N	2	N	N	Y	Y	N	Y	58	71	51	67	58					
8	5766	B/O Usha S Katti	27	36.2	N	Y	2/15/2018	1124	M	2.9	N	y	N	N	N	<1	Y	N	Y	N	Y	Y	68	65	64	72	67					
9	6965	B/O Ashwini A Rathod	24	35 .5	Y	N	2/25/2018	1832	F	2.25	Y	Y	N	N	N	>24	N	Y	N	N	Y	Y	43	52	60	76	68	Y	ASYMP	breastfeeding + EBM+ formula	41	58.6
10	7129	B/O Rajeshwari R Botre	31	34.6	Y	N	2/26/2018	1101	M	2.45	y	y	N	N	N	>24	N	N	Y	Y	Y	Y	44	68	65	58	60	Y	ASYMP	BF	48	43.8
11	7362	B/O Bhagyashree V Awati	26	35.6	N	Y	3/1/2018	1456	M	2.59	N	Y	N	N	N	12	Y	N	Y	N	N	N	73	92	101	96	98					
12	7609	B/O Shivaleela R Makanpur	25	36.4	N	Y	3/3/2018	1730	M	2.17	Y	N	Y	N	Y	>24	N	Y	Y	Y	Y	Y	41	74	64	76	72	Y	ASYMP	breastfeeding +EBM	32	36.7
13	7929	B/O Kashibai S Madar	20	36.5	N	Y	3/6/2018	1810	M	2.62	N	Y	N	N	N	>24	Y	N	Y	Y	N	Y	74	77	85	109	68					
14	8072	B/O Rubinabanu M Walikar	23	35.6	Y	N	3/6/2018	2109	F	2.38	Y	Y	N	N	N	12	N	Y	N	N	Y	Y	53	66	78	75	71					
15	8285	B/O Jyothi R Hadapad	22	36.6	N	Y	3/8/2018	1024	M	2.65	N	Y	N	N	N	>24	Y	N	Y	Y	Y	N	57	72	71	81	78					
16	8521	B/O Siddamma S Managuli	23	35	Y	N	3/10/2018	945	M	2.14	Y	N	Y	N	Y	5	N	N	Y	N	Y	Y	45	64	63	60	66					
17	9412	B/O Shruthi B Honnutagi	22	36.3	Y	N	3/17/2018	1127	F	1.64	Y	N	Y	N	Y	>24	N	N	Y	Y	Y	Y	58	64	78	59	53					
18	10101	B/O Ayasha S Nadaf	23	36.6	N	Y	3/22/2018	1531	M	2.42	Y	Y	N	N	N	>24	Y	Y	Y	Y	N	Y	60	64	62	60	57					
19	10775	B/O Geetabai P Ganti	32	36.5	N	Y	3/28/2018	1601	F	4.2	N	N	N	Y	N	18	Y	Y	N	Y	N	Y	57	62	72	72	82					
20	11481	B/O Kavitha C Katnalli	22	36.1	Y	N	4/3/2018	1035	F	3.04	N	Y	N	N	N	>24	N	N	Y	N	Y	N	76	72	76	77	41	Y	ASYM	BREASTFEEDING+EBM	44	55.6
21	11768	B/O Rajeshwari S Wakrani	28	36.5	N	Y	4/5/2018	1830	M	3.61	N	N	N	Y	N	>24	Y	N	Y	Y	Y	Y	67	68	72	70	61					
22	13357	B/O Hemavathi S Maltagi	23	36.5	Y	N	4/19/2018	1635	F	2.87	N	Y	N	N	N	<1	N	Y	Y	N	Y	Y	67	68	53	88	74					
23	13895	B/O Savitha S Naragund	30	36.1	N	Y	4/24/2018	2121	M	3.45	N	N	N	Y	N	>24	Y	N	N	Y	N		52	126	70	71	74					
24	13958	B/O Gangubai S Shinde	22	36	Y	N	4/25/2018	1438	M	2.29	Y	N	Y	N	Y	>24	N	N	Y	N	Y	Y	42	90	56	74	61	Y	ASYMP	BF+EBM	54	58.8
25	14822	B/O Deepika P Gurudhar	25	36.5	N	Y	2/5/2018	1243	M	3	N	Y	N	N	N	>24	Y	N	Y	Y	N	Y	73	75	70	81	69					
26	15471	B/O Mahanteshwari D Harijan	24	36.6	N	Y	5/7/2018	1802	F	2.02	Y	N	Y	N	Y	6	N	Y	Y	Y	N	Y	75	76	68	72	44	Y	ASYMP	BREASTFEEDING	48	56.2
27	18366	B/O Rajeshwari Y Honawad	31	36.4	Y	N	5/30/2018	1001	F	3.48	N	N	N	Y	N	>24	Y	N	Y	N	Y	Y	84	72	60	59	72					
28	18385	B/O Anarkali S Mulla	26	36.4	N	Y	5/31/2018	1725	M	2.45	Y	Y	N	N	N	>24	Y	Y	Y	Y	N	N	68	59	64	61	63					

29	19218	B/O Saritha H Pawar	23	36	Y	N	6/6/2018	1636	M	2.34	Y	Y	N	N	N	10	Y	N	N	N	Y	Y	62	66	66	71	70					
30	20036	B/O Kousar S Mulla	24	36	Y	N	6/13/2018	1146	M	1.95	Y	N	Y	N	Y	>24	N	N	Y	Y	N	Y	67	52	72	65	56					
31	20967	B/O Umashree M Patil	26	36.2	N	Y	6/19/2018	1200	M	2.16	Y	N	Y	N	N	>24	N	Y	Y	N	Y	N	64	56	54	57	81					
32	21380	B/O Suman P Chavan	25	36.3	Y	N	6/25/2018	1147	M	2.78	N	Y	N	N	N	8	Y	N	Y	Y	Y	Y	48	64	69	52	64					
33	21575	B/O Kasturi V Kari	28	34.5	Y	N	6/26/2018	1110	M	1.95	Y	Y	N	N	N	>24	N	N	Y	Y	N	Y	65	71	82	60	65					
34	21728	B/O Nagabai D Kattimani	24	36.6	N	Y	6/27/2018	1226	F	3.74	N	N	N	Y	N	>24	Y	N	Y	N	Y	N	64	55	52	55	52					
35	21928	B/O Maya D kambale	26	35.1	Y	N	6/29/2018	1144	M	2.5	N	Y	N	N	N	<1	N	Y	Y	Y	N	Y	32	63	56	62	67	Y	ASYMP	BREASTFEEDING+ EBM	42	62.1
36	22147	B/O Vaishali P Alakunte	27	34.4	Y	N	7/1/2018	948	M	2.59	N	Y	N	N	N	>24	Y	N	N	Y	Y	Y	60	75	52	73	55					
37	22040	B/O Malanabi S Walikar	26	36	N	Y	7/2/2018	1104	M	3.4	N	N	N	Y	N	6	N	Y	Y	N	N	Y	48	50	50	56	45					
38	22286	B/O Arathi H Sasatti	27	36	Y	N	7/2/2018	1807	M	3.45	N	Y	N	N	N	>24	Y	N	Y	Y	Y	Y	59	75	76	68	62					
39	22882	B/O Kavitha R Rathod	22	36.5	N	Y	7/6/2018	1723	M	4	N	N	N	Y	N	10	N	Y	Y	N	Y	Y	53	81	82	82	72					
40	23597	B/O Bhagyashree S Nagaral	24	34.6	Y	N	7/12/2018	1403	F	1.7	Y	N	Y	N	Y	>24	N	Y	Y	Y	Y	Y	30	47	42	56	60	Y	ASYMP	BF+EBM+FORMULA	40	53.4
41	23998	B/O Bhagyashree M Divatagi	28	36.5	N	Y	7/16/2018	1417	F	3.47	N	N	N	Y	N	18	Y	N	N	Y	Y	Y	70	60	72	70	72					
42	24418	B/O Padmavathi S Hanamane	29	36.2	Y	N	7/19/2018	1248	M	2.53	N	Y	N	N	N	>24	Y	N	Y	N	N	Y	87	61	70	68	70					
43	24767	B/O Gouramma M Talawar	27	36.6	N	Y	7/22/2018	1818	M	2.49	Y	N	Y	N	N	>24	N	N	Y	N	Y	Y	69	72	74	78	98					
44	26069	B/O Rajeshwari B Havulager	21	35.6	Y	N	8/2/2018	1046	M	2.13	Y	N	Y	N	Y	4	N	Y	Y	Y	N	Y	53	73	60	54	47					
45	28745	B/O Lakkamma B Aahori	20	36.6	N	Y	8/24/2018	1246	M	2.68	N	Y	N	N	N	>24	Y	N	Y	N	Y	Y	33		58	47	55	Y	ASYMPTOMATIC	BF+EBM+FORMULA	38	54.2
46	29085	B/O Rupali A Pawar	25	36.2	Y	N	8/26/2018	1026	F	2.24	Y	Y	N	N	N	<1	N	Y	Y	N	N	N	79	73	72	65	67					
47	29381	B/O Kaveri S Donur	25	34.6	Y	N	8/28/2018	1719	F	1.807	Y	Y	N	N	N	>24	Y	N	N	Y	Y	Y	72	86	93	92	74					
48	30534	B/O Savitha S Tadalagi	23	36.5	Y	N	9/6/2018	1137	F	3.8	N	N	N	Y	N	>24	Y	Y	Y	N	Y	Y	55	64	72	62	50					
49	30479	B/O Annapurna A Navi	23	36.5	N	Y	9/6/2018	1208	M	2.63	N	Y	N	N	N	>24	Y	N	Y	Y	N	N	50	67	56	53	63					
50	30805	B/O Ujwala K Pujari	25	34.4	Y	N	9/8/2018	1917	M	2.55	N	N	N	Y	N	10	N	N	Y	Y	Y	Y	66	65	62	66	60					
51	31368	B/O Nirmala V Timmapur	26	36.5	Y	N	9/13/2018	1314	F	2.5	N	Y	N	N	N	>24	Y	Y	Y	N	Y	Y	84	72	60	68	64					
52	31742	B/O Laxmi A Talabari	25	36.4	N	Y	9/17/2018	1638	F	2.4	Y	Y	N	N	N	6	N	N	N	Y	N	Y	110	113	98	95	63					
53	32200	B/O Savithri M Halli	24	36.5	Y	N	9/20/2018	1254	F	2.51	N	Y	N	N	N	>24	N	Y	Y	N	Y	Y	60	59	65	97	86					
54	32636	B/O Rekha H Biradar	27	36.6	Y	N	9/23/2018	1046	M	2.3	Y	N	Y	N	N	>24	N	N	Y	Y	Y	Y	64	78	68	65	56					
55	34045	B/O Annapurna R Kankanawadi	26	36.5	N	Y	10/3/2018	1149	M	3.06	N	Y	N	N	N	>24	Y	N	Y	N	N	N	61	48	66	72	56					
56	33242	B/O Shashikala R Dolli	22	36.2	Y	N	10/5/2018	1100	F	3.1	N	Y	N	N	N	<1	N	Y	Y	Y	Y	Y	66	58	54	57	47					
57	35259	B/O Bismilla G Walikar	24	36.1	Y	N	10/14/2018	923	M	2.817	N	Y	N	N	N	>24	N	N	N	N	Y	Y	58	65	78	66	76					
58	36924	B/O Mallamma J bhudgulli	26	36.6	N	Y	10/29/2018	1227	M	1.996	Y	N	Y	N	Y	8	N	N	Y	Y	N		47	47	67	48	52					
59	37191	B/O Shivaleela B Goudar	28	36.6	Y	N	10/30/2018	905	M	1.905	Y	N	Y	N	Y	>24	N	Y	Y	N	Y	Y	39	71	48	61	58	Y	ASYMP	BF	42	63
60	37359	B/O Sabiya G Pattar	28	36	N	Y	10/31/2018	1041	F	2.5	N	Y	N	N	N	<1	Y	N	Y	Y	Y	N	48	43	68	43	61	Y	ASYMP	BF	48	58.2
61	37259	B/O Preethi A Bulagond	24	36.4	Y	N	10/31/2018	816	M	2.6	N	Y	N	N	N	3	N	Y	N	N	Y	Y	68	66	68	64	72					
62	38211	B/O Kavitha S Hadapad	22	35.3	N	Y	11/9/2018	1732	M	2.25	Y	Y	N	N	N	>24	Y	Y	Y	Y	Y	Y	72	68	77	64	43	Y	ASYMP	BF	46	56.6
63	28419	B/O Shainaz H Walikar	28	34.2	Y	N	11/10/2018	1137	M	1.86	Y	Y	N	N	N	>24	N	N	Y	N	N	Y	66	70	51	57	52					
64	38462	B/O Shobha R Batagunnar	25	36.2	N	Y	11/10/2018	1416	F	4.12	N	N	N	Y	N	>24	Y	Y	Y	Y	Y	N	47	58	60	54	62					
65	40291	B/O Shivaleela S Patil	30	36.6	N	Y	11/27/2018	1311	F	2.44	Y	Y	N	N	N	8	N	N	Y	Y	N	Y	64	48	48	45	58					
66	40556	B/O Najanin M Patil	26	36.3	Y	N	11/29/2018	2019	M	2.6	N	Y	N	N	N	>24	Y	Y	N	Y	N	Y	32	48	64	55	64	Y	ASYMP	BF+EBM+FORMULA	46	50.2
67	40808	B/O Seeta V Mathapati	26	36	Y	N	12/1/2018	1127	M	2.14	Y	Y	N	N	N	<1	N	N	Y	Y	Y	Y	58	39	57	51	58	Y	ASYMP	EBM+BF	28	43.4
68	40935	B/O Roopa S Salarkar	24	36	N	Y	12/3/2018	1426	F	2	Y	N	Y	N	Y	>24	N	Y	Y	N	N	Y	41	47	60	55	60	Y	ASYMP	BF	52	56.2
69	41443	B/O Boramma L Kumbar	30	36.4	N	Y	12/7/2018	1158	F	2.56	N	Y	N	N	N	>24	Y	N	Y	Y	N	Y	56	52	47	60	49					
70	42030	B/O Laxmi A Jangamashetti	20	36.1	Y	N	12/12/2018	1548	M	2.5	N	Y	N	N	N	4	N	Y	Y	Y	Y	Y	43	44	52	54	68	Y	ASYMP	BF	50	57.6
71	43169	B/O Laxmi S Hiremath	25	36.4	N	Y	12/22/2018	1726	F	2.7	N	Y	N	N	N	>24	Y	N	Y	N	N	N	55	74	55	58	67					
72	43989	B/O Savithri B Hattali	30	36	N	Y	12/31/2018	1439	M	2.66	N	Y	N	N	N	>24	N	Y	N	Y	Y	Y	78	69	68	60	80					

73	377	B/O Shruti M Singe	27	36.1	Y	N	1/3/2019	1607	F	2.32	Y	N	Y	N	Y	10	N	N	Y	N	N	Y	26	47	58	50	57	Y	ASYMP	EBM+BF	52	54.4
74	1397	B/O Preethi S Patil	28	36	Y	N	1/12/2019	1520	M	2.5	N	Y	N	N	N	6	Y	Y	Y	Y	Y	Y	44	46	45	45	40	Y	ASYMP	EBM+BF	48	56.6
75	1427	B/O Zareena H Hatawali	24	36	Y	N	1/12/2019	1145	M	2.166	Y	N	Y	N	Y	>24	N	N	Y	N	N	Y	51	58	59	71	48					
76	1557	B/O Sandya S Ranadavi	26	36	N	Y	1/14/2019	1109	F	2.09	Y	N	Y	N	Y	<1	N	Y	Y	Y	Y	Y	62	55	52	59	42	Y	ASYMP	EBM+BF	41	51.6
77	2171	B/O Shaila D Ilali	22	35	Y	N	1/19/2019	1532	M	2.03	Y	Y	N	N	N	>24	N	N	Y	Y	N	Y	57	64	65	65	58					
78	2335	B/O Bouramma B Umarji	26	35.5	N	Y	1/21/2019	1319	M	2.4	Y	Y	N	N	N	>24	Y	Y	N	N	Y	Y	74	79	76	78	84					
79	3344	B/O Shaila N Jibi	25	36.6	Y	N	1/30/2019	1755	M	3.3	N	Y	N	N	N	>24	Y	N	Y	Y	Y	N	56	52	60	60	62					
80	3638	B/O Prema S Karjol	31	36.3	N	Y	2/2/2019	1343	M	2.16	Y	N	Y	N	Y	12	N	N	Y	N	N	Y	48	54	57	57	62					
81	3844	B/O Anitha B Mudnur	25	36	Y	N	2/4/2019	1145	F	1.925	Y	N	Y	N	Y	>24	N	Y	Y	Y	Y	Y	86	41	40	41	36	Y	ASYMP	EBM+BF	48	60.8
82	3864	B/O Parvathi R Sanalli	27	36	Y	N	2/4/2019	1807	M	3.26	N	Y	N	N	N	2	N	N	Y	N	N	Y	68	74	78	71	62					
83	4280	B/O Jayashree V Rathod	22	36.2	Y	N	2/7/2019	1814	M	2.26	Y	N	Y	N	Y	>24	N	N	N	Y	Y	Y	43	72	56	68	54	Y	ASYMP	BF	48	52.8
84	4326	B/O Samren M Bagewadi	23	36	Y	N	2/8/2019	1026	F	2.65	N	Y	N	N	N	>24	Y	N	Y	Y	Y	Y	48	49	63	56	64					
85	5090	B/O Hulagemma Y Manguli	29	36.3	N	Y	2/14/2019	1614	M	2.9	N	Y	N	N	N	12	N	Y	Y	N	Y	Y	41	63	61	60	67	Y	ASYMP	BF	51	52.6
86	5608	B/O Rekha B Koli	28	36	Y	N	2/19/2019	1054	F	2.7	N	Y	N	N	N	>24	N	N	Y	Y	N	N	57	70	64	47	62					
87	5689	B/O Reshma V Pawar	32	36	Y	N	2/20/2019	1748	M	2.39	Y	Y	N	N	N	>24	N	N	Y	Y	N	Y	64	73	53	62	81					
88	5919	B/O Sudharani K Walikar	22	36.2	N	Y	2/22/2019	1106	F	3.08	N	Y	N	N	N	6	Y	Y	N	Y	Y	Y	63	61	66	67	65					
89	6695	B/O Pooja C Mathapati	29	36.4	N	Y	3/1/2019	1728	F	2.76	N	Y	N	N	N	>24	N	N	Y	N	N	N	47	44	56	48	42	Y	ASYMP	BF	54	47.2
90	6709	B/O Sharanamma S Hadakal	25	36	Y	N	3/1/2019	957	M	2.8	N	Y	N	N	N	<1	Y	Y	Y	N	Y	Y	42	63	61	72	64	Y	ASYMP	BF	46	58.2
91	6864	B/O Sakkubai Y Adalli	20	36	Y	N	3/4/2019	1156	M	3.4	N	N	N	Y	N	>24	N	N	N	Y	N	Y	59	54	73	47	41	Y	ASYMP	BF	40	45.6
92	6965	B/O Ayesha T Bagalkot	26	36.6	N	Y	3/5/2019	1542	F	3.25	N	Y	N	N	N	>24	Y	N	N	N	Y	Y	33	69	58	55	41	Y	ASYMP	BF+EBM	42	54.8
93	7700	B/O Nakubai S Kare	23	36.6	Y	N	3/10/2019	1238	F	2.92	N	Y	N	N	N	10	N	Y	Y	Y	N	Y	70	66	61	60	60					
94	9040	B/O Kashibai S Handaral	31	36.5	N	Y	3/23/2019	1426	M	2.95	N	Y	N	N	N	>24	Y	N	Y	N	Y	Y	60	59	46	59	47					
95	9045	B/O Laxmi A Navi	26	36	Y	N	3/23/2019	1756	F	2.2	Y	Y	N	N	N	>24	N	N	Y	Y	N	Y	70	72	66	66	68					
96	9144	B/O Laxmi S Maskanal	27	36	N	Y	3/24/2019	1209	F	2.2	Y	N	Y	N	N	>24	N	N	Y	Y	Y	Y	41	57	50	55	41	Y	ASYMP	BF+EBM	42	51
97	9152	B/O Basamma N Bidari	26	36	Y	N	3/24/2019	1631	F	2.46	Y	Y	N	N	N	4	Y	Y	N	N	N	Y	45	40	48	57	53	Y	ASYMP	EBM+BF	36	54.8
98	9410	B/O Sangeeta P Sindagi	28	36.1	Y	N	3/26/2019	1238	M	2.38	Y	N	Y	N	Y	12	N	N	Y	Y	Y	Y	47	56	51	43	64	Y	ASYMP	BF+EBM	43	57.4

TERM

SL NO	IP NO	Patient data	maternal data								LBW	AGA	SGA	LGA	IUGR	First feed (hrs)	Feeding history Day 1			Feeding history Day 2			blood sugar					HYPOGLYCEMIA	symptoms	management	Blood sugar (Lab)	PCV
			age	gestation	NVD	LSCS	DOB	TOB	Sex	Birth wt.							sucking	production	activity	sucking	production	activity	1hrs	2hrs	6hrs	24 hrs	48 hrs					
1	134	B/O BASSAMA S. HORTI	26	38.5	N	Y	1/2/2018	15:20	M	2.94	N	Y	N	N	N	5	N	Y	Y	Y	N	Y	61	72	80	60	66					
2	270	B/O HINDUMATI C. GOLASANGI	24	39.2	Y	N	1/3/2018	12:53	M	3.59	N	N	N	Y	N	<1	Y	N	N	N	N	Y	78	62	69	73	66					
3	672	B/O KAVITA M. KONTIKAL	25	39.3	Y	N	1/5/2018	17:56	F	2.31	Y	N	Y	N	Y	>24	Y	Y	Y	Y	Y	N	103	60	63	54	41	Y	ASYMP	Breastfeeding+EBM	43	49.4
4	832	B/O SAVITA H. KOVATAGI	30	38.3	N	Y	1/7/2018	14:48	F	3.63	N	N	N	Y	N	8	N	N	Y	Y	Y	Y	40	62	63	84	74	Y	ASYMP	Breastfeeding	45	51.7
5	1083	B/O LAXMI YARANAL	23	39.6	N	Y	1/9/2018	17:22	F	3.53	N	N	N	Y	N	>24	N	N	Y	N	N	Y	72	88	103	84	68					
6	1235	B/O SHRUTI N. GODDI	26	39.3	N	Y	1/10/2018	17:00	M	2.39	Y	N	Y	N	N	10	Y	Y	Y	Y	Y	Y	72	54	67	62	78					
7	1552	B/O SAVITRI J.PUJARI	28	38	Y	N	1/13/2018	12:48	F	3.03	N	Y	N	N	N	4	N	Y	Y	Y	N	Y	79	74	84	77	64					
8	2506	B/O RAJASHREE D. DALLI	30	38.4	N	Y	1/20/2018	12:30	M	2.8	N	Y	N	N	N	>24	Y	N	N	Y	Y	Y	60	69	75	73	87					
9	3219	B/O VIDYA R. DESAI	26	38.5	Y	N	1/26/2018	14:39	M	3.44	N	N	N	Y	N	3	Y	Y	Y	Y	Y	Y	61	65	54	54	68					
10	4177	B/O RENUKA S. KABBUR	24	39.3	N	Y	2/3/2018	14:25	M	3.06	N	Y	N	N	N	>24	N	N	Y	Y	N	Y	50	52	50	41	72	Y	ASYMP	BF+ EBM+Formula	25	60.9
11	4173	B/O SANA A. NATARAS	30	38.6	N	Y	2/2/2018	20:54	F	3.51	N	N	N	Y	N	>24	Y	N	Y	Y	N	Y	69	82	62	76	63					
12	5514	B/O SAVITA V. WALI	27	38	Y	N	2/13/2018	19:30	M	2.98	N	Y	N	N	N	4	N	Y	Y	N	Y	Y	74	78	67	70	93					
13	5915	B/O NIKITA A. HOSAMANI	29	37.5	N	Y	2/16/2018	17:07	M	2.82	N	Y	N	N	N	8	N	N	Y	Y	Y	N	66	72	90	83	76					
14	6648	B/O POOJA G. MALIPATIL	24	40	Y	N	2/22/2018	17:51	M	4.14	N	N	N	Y	N	<1	Y	Y	Y	N	N	Y	78	62	60	86	87					
15	7578	B/O SWARNA B. SHINIL	26	38.1	N	Y	3/7/2018	11:02	F	2.6	N	Y	N	N	N	>24	N	N	N	Y	N	Y	96	68	78	84	83					
16	7771	B/O KALAVATI S. ALOOR	40	40.2	Y	N	3/5/2018	20:00	F	4.38	N	N	N	Y	N	5	Y	Y	Y	Y	Y	Y	74	68	76	71	72					
17	9040	B/O KAVITA A. PATIL	27	39.4	N	Y	3/14/2018	12:48	M	3.96	N	N	N	Y	N	12	N	N	Y	Y	Y	Y	86	77	72	74	86					
18	9497	B/O JAYASHREE R. BIRADAR	34	38.4	N	Y	3/18/2018	11:15	M	2.95	N	Y	N	N	N	>24	Y	Y	Y	Y	N	Y	64	80	64	59	67					
19	10130	B/O LAXMI S. BAJARMATH	27	38	Y	N	3/22/2018	18:21	M	3.782	N	N	N	Y	N	<1	N	Y	Y	Y	Y	Y	95	76	106	87	82					
20	10525	B/O JYOTI K. JAMBAGI	30	39.6	N	Y	3/26/2018	13:12	F	3.52	N	Y	N	N	N	>24	Y	N	Y	N	Y	Y	60	70	75	84	70					
21	11247	B/O SOUMYA S. SARASIMBI	24	37.5	N	Y	4/2/2018	11:29	F	2.25	Y	Y	N	N	N	18	N	Y	N	Y	Y	Y	43	62	56	86	78	Y	ASYMP	breastfeeding + EBM+ formula	41	58.6
22	11802	B/O BHAGYASHREE S. MADAR	25	38.3	Y	N	4/6/2018	15:42	M	3	N	Y	N	N	N	6	Y	Y	Y	N	N	Y	68	73	88	95	89					
23	12837	B/O YASMIN F. MULLA	22	39.3	N	Y	4/15/2018	11:16	M	2.3	Y	N	Y	N	Y	>24	Y	N	Y	Y	Y	Y	76	95	96	71	41	Y	ASYMP	breastfeeding + EBM	40	54.9
24	13365	B/O MAHANANDA N. JALWADI	25	39.5	Y	N	4/19/2018	17:56	M	3.8	N	Y	N	N	N	4	N	N	Y	Y	N	Y	57	67	65	83	104					
25	13517	B/O KAVITA S. MADAR	20	39	N	Y	4/22/2018	12:33	F	2.42	Y	N	Y	N	N	8	Y	Y	Y	Y	Y	Y	106	78	75	106	85					
26	14623	B/O MEENAKSHI S. WADDARI	28	39.6	Y	N	4/30/2018	11:40	M	2.69	N	Y	N	N	N	>24	N	Y	Y	N	Y	N	74	95	103	98	66					
27	14766	B/O SAVITRI G. TOTABUR	31	39.3	Y	N	5/2/2018	12:48	M	2.53	N	Y	N	N	N	<1	Y	N	Y	Y	Y	Y	74	61	103	51	62					
28	152776	B/O KAVITA P. RATHORE	27	38.6	N	Y	5/5/2018	17:40	F	4.22	N	N	N	Y	N	>24	Y	Y	Y	N	N	Y	78	54	67	88	78					
29	15516	B/O PARAVATI M. SARABAGI	32	38	N	Y	5/8/2018	7:20	M	2.91	N	Y	N	N	N	10	N	N	Y	Y	Y	Y	50	63	62	112	99					
30	15841	B/O SHARDA S. BIRADAR	33	38.2	Y	N	5/12/2018	16:57	M	3.01	N	Y	N	N	N	2	Y	Y	Y	Y	N	Y	60	67	53	93	58					

31	16571	B/O BHAGYASHREE C. KAMBAL	32	38	N	Y	5/16/2018	19:51	M	2.2	Y	N	Y	N	Y	>24	N	N	N	Y	Y	Y	42	82	74	55	42	Y	ASYMP	BF+EBM+1	39	62.6
32	16962	B/O MENAZ J. JAMADAR	27	38.5	Y	N	5/19/2018	17:40	F	3.03	N	Y	N	N	N	<1	Y	Y	Y	Y	N	Y	50	76	65	66	73					
33	16996	B/O NEELAMBIKA S. SARAWAD	22	40.1	N	Y	5/20/2018	13:18	F	3.84	N	Y	N	N	N	>24	Y	N	Y	N	Y	Y	56	59	66	73	80					
34	17652	B/O SUDHA M. BADIGER	30	38	Y	N	5/25/2018	13:20	F	2.28	Y	N	Y	N	Y	4	N	Y	N	Y	Y	Y	58	86	78	53	68					
35	18051	B/O AISHWARYA S. KAMBALE	21	39.6	N	Y	5/28/2018	14:56	F	2.75	N	Y	N	N	N	<1	N	Y	Y	Y	Y	N	92	86	72	78	78					
36	18257	B/O Savithri V Siddapur	31	38.4	N	Y	5/30/2018	1541	M	3.46	N	N	N	Y	N	>24	Y	N	Y	Y	N	Y	83	83	70	67	65					
37	18810	B/O Laxmi B Nagod	27	38.2	Y	N	6/3/2018	1312	M	2.28	Y	N	Y	N	Y	>24	N	N	Y	N	Y	Y	82	72	75	78	78					
38	19260	B/O Rudramma S Biradar	22	39.4	N	Y	6/4/2018	1645	M	3.22	N	Y	N	N	N	12	Y	Y	N	Y	N	Y	47	34	58	64	75	Y	ASYMP	BREASTFEEDING+ EBM+FORMULA+	32	48.7
39	19489	B/O MANJULA P DEVAKAR	31	38	Y	N	6/7/2018	1937	F	2.42	Y	N	Y	N	N	>24	N	N	Y	Y	Y	Y	62	72	89	79	67					
40	19516	B/O SAVITHA S TALAWAR	26	39.3	N	Y	6/8/2018	1633	F	4.22	N	N	N	Y	N	<1	Y	Y	Y	Y	N	Y	74	120	70	106	74					
41	19912	B/O RENUKA D KUMBAR	29	38.4	N	Y	6/12/2018	1600	M	2.414	Y	N	Y	N	N	>24	Y	N	Y	Y	Y	Y	78	73	70	75	55					
42	20350	B/O AMBIKA S UTASI	26	40.1	Y	N	6/15/2018	1850	M	2.78	N	Y	N	N	N	5	N	N	Y	N	Y	Y	60	77	78	66	77					
43	20827	B/O GURUDEVI S HIREMATH	26	39.1	N	Y	6/20/2018	1057	M	3.09	N	Y	N	N	N	>24	Y	Y	Y	Y	Y	Y	88	80	87	77	90					
44	21118	B/O ANITHA B TAKARE	28	39.5	N	Y	6/22/2018	1422	F	3.11	N	Y	N	N	N	8	Y	Y	Y	Y	Y	Y	52	44	42	56	59	Y	ASYMP	BREASTFED+EBM		
45	21329	B/O ISHWARAWWA V NAGATHAN	19	39.1	Y	N	6/25/2018	1307	M	2.65	N	Y	N	N	N	<1	Y	N	Y	N	N	Y	67	68	57	65	49					
46	21766	B/O RENUKABAI L DASHWANT	27	39	N	Y	6/28/2018	1217	F	3.48	N	Y	N	N	N	>24	N	Y	Y	Y	Y	N	65	61	68	72	76					
47	22050	B/O PREETHI P BEVOR	27	38.2	N	Y	6/30/2018	1058	F	3.22	N	Y	N	N	N	>24	Y	N	N	N	N	Y	60	75	78	71	53					
48	22320	B/O SHREEDEVI J BAJANTRI	20	39.2	Y	N	7/3/2018	1356	M	2.85	N	Y	N	N	N	4	N	Y	Y	Y	Y	Y	51	42	59	58	68	Y	ASYMP	BREASTFEEDIMG		
49	22939	B/O ANITA S BUSARI	29	40.4	N	Y	7/7/2018	1126	F	3.29	N	Y	N	N	N	14	Y	N	Y	Y	Y	Y	74	62	65	60	87					
50	23640	B/O SHASHIKALA B CHINNETI	26	39.2	N	Y	7/13/2018	1349	F	3.8	N	N	N	Y	N	>24	N	N	N	N	Y	Y	63	58	72	67	84					
51	23993	B/O ASHWINI R HADIMANI	23	38.1	Y	N	7/16/2018	1237	M	2.75	N	Y	N	N	N	5	Y	Y	Y	Y	N	Y	65	52	85	77	81					
52	24289	B/O RAJASHREE M MALI	19	39	N	Y	7/18/2018	1556	F	2.2	Y	N	Y	N	N	>24	N	Y	Y	Y	Y	Y	48	63	68	45	74					
53	24561	B/O SHILPA V HIPPARAGI	26	38.3	Y	N	7/20/2018	1330	F	4	N	N	N	Y	N	6	Y	N	Y	N	Y	Y	60	70	66	66	60					
54	25179	B/O YASHODA M SURYAVAMSHI	23	39.2	Y	N	7/25/2018	2002	M	2.4	Y	N	Y	N	N	<1	N	N	Y	Y	N	Y	42	48	48	52	60	Y	ASYMP	BREASTFEEDING+EBM		
55	25700	B/O SHANTA S JAINAPUR	22	39.1	N	Y	7/30/2018	1640	F	2.44	Y	N	Y	N	N	>24	Y	Y	Y	Y	Y	Y	63	58	49	62	57					
56	26100	B/O DEEPA S BIRADAR	25	39.4	Y	N	8/2/2018	1642	M	3.1	N	Y	N	N	N	12	N	N	Y	N	Y	Y	47	58	74	72	62					
57	26579	B/O ROOPA R HARIJAN	26	40	N	Y	8/7/2018	2013	F	2.4	Y	N	Y	N	N	>24	Y	Y	N	Y	N	Y	68	72	68	71	64					
58	27290	B/O KAVERI R JOSHI	27	40	N	Y	8/12/2018	2343	M	3.03	N	Y	N	N	N	8	N	N	Y	N	Y	Y	63	67	67	63	77					
59	27481	B/O BOURAMMA R AVERI	24	39.3	Y	N	8/14/2018	1058	F	3.9	N	Y	N	N	N	<1	N	Y	Y	Y	N	Y	42	54	61	68	56	Y	ASYMP	BF		
60	27877	B/O ASHWINI V JAMBAGI	24	39.3	Y	N	8/17/2018	1308	F	3.41	N	Y	N	N	N	>24	Y	N	Y	Y	Y	Y	78	64	66	66	72					
61	28738	B/O DANESHWARI R LOKAPUR	27	39.3	N	Y	8/23/2018	1034	M	3.23	N	Y	N	N	N	10	N	Y	Y	Y	N	Y	64	60	55	62	68					
62	29243	B/O POOJA T PANDRE	27	39.2	Y	N	8/27/2018	1627	M	2.45	Y	N	Y	N	N	12	Y	N	Y	N	Y	N	63	74	56	64	52					
63	29976	B/O SEEMA A WAGAMORE	29	38.3	Y	N	9/2/2018	943	F	4.52	N	N	N	Y	N	<1	N	Y	Y	Y	N	Y	30	73	76	78	74	Y	ASYMP	BF+EBM	32	59.5
64	30463	B/O SAVITHA K SHEGUNSHI	20	38	N	Y	9/6/2018	1059	M	2.75	N	Y	N	N	N	>24	Y	N	N	Y	Y	Y	72	70	72	67	78					
65	30838	B/O LAXMI S BELUR	27	39.5	N	Y	9/9/2018	1049	F	2.4	Y	N	Y	N	N	6	Y	Y	Y	N	Y	Y	49	67	70	92	82					
66	31273	B/O SHANTABAI C AUKALAGI	24	38.1	Y	N	9/12/2018	1618	M	2.64	N	Y	N	N	N	>24	Y	Y	Y	Y	N	Y	87	78	64	80	72					
67	31591	B/O AKSHATA P PATIL	25	40.1	Y	N	9/15/2018	1252	M	3.8	N	N	N	Y	N	8	N	N	Y	N	Y	Y	74	75	66	76	92					
68	31987	B/O SUGHANDA T KADAM	23	39.5	N	Y	9/18/2018	1551	F	3.73	N	Y	N	N	N	<1	Y	N	Y	Y	Y	Y	65	60	62	69	55					
69	32851	B/O SUVARNA S WALIKAR	28	38.5	Y	N	9/25/2018	954	M	3.6	N	Y	N	N	N	>24	Y	Y	Y	Y	N	Y	34	72	61	49	47	Y	ASYMP	BF+EBM	41	55.2
70	33849	B/O SHASHIKALA G CHIKODI	24	38.3	N	Y	10/2/2018	1148	M	2.4	Y	N	Y	N	N	8	N	N	N	N	Y	Y	64	53	74	61	59					
71	34385	B/O KAMALABAI L NAIK	23	39.4	N	Y	10/6/2018	1637	M	2.33	Y	N	Y	N	Y	>24	Y	N	Y	Y	Y	Y	58	59	59	53	52					
72	35079	B/O SANIYA M KALADAGI	24	38.1	Y	N	10/12/2018	748	M	2.4	Y	N	Y	N	N	5	N	Y	Y	N	Y	Y	61	56	72	49	60					
73	35269	B/O ASHWINI P MALI	26	38.3	Y	N	10/15/2018	1328	F	2.49	Y	Y	N	N	N	>24	Y	Y	Y	Y	Y	N	65	70	64	58	60					
74	35999	B/O KAVITHA M DAPPALADINNI	24	38	N	Y	10/21/2018	1538	M	2.4	Y	N	Y	N	N	4	N	N	Y	Y	Y	Y	30	56	61	78	64	Y	ASYMP	EBM+BF	36	52

75	37089	B/O PALLAVI A BIRADAR	25	38	N	Y	10/29/2018	1330	M	2.4	Y	N	Y	N	N	>24	Y	Y	Y	Y	Y	Y	68	63	67	58	64					
76	37816	B/O SANGETA Y NAGENAVAR	24	39.3	Y	N	11/5/2018	1221	F	2.6	N	Y	N	N	N	6	N	Y	N	Y	N	N	25	48	51	42	84	Y	ASYMP	BF+FORMULA		
77	38223	B/O RAGINI S JALAPUR	28	39.1	N	Y	11/9/2018	1545	M	2.6	N	Y	N	N	N	>24	N	N	Y	Y	Y	Y	82	54	66	62	63					
78	38769	B/O JAYASHREE G SATAPUR	30	38.1	N	Y	11/13/2018	1544	M	3.6	N	Y	N	N	N	12	Y	Y	N	N	Y	Y	64	65	66	63	74					
79	38882	B/O ARATI S BASALI	23	39.4	Y	N	11/14/2018	1400	F	2.61	N	Y	N	N	N	<1	Y	N	Y	Y	N	Y	39	56	62	86	72	Y	ASYMP	EBM+BF	44	58.5
80	39643	B/O BHARATI G PATIL	24	38.6	N	Y	11/21/2018	922	F	2.44	Y	N	Y	N	N	>24	N	Y	Y	Y	N	Y	54	53	48	50	61					
81	40171	B/O MALANBI B DHAVALAGI	30	38.3	Y	N	11/26/2018	1224	M	3.84	N	N	N	Y	N	10	N	Y	Y	N	Y	Y	44	65	66	64	72					
82	40903	B/O PUTTAKKA S DODAMAMANI	28	39.3	N	Y	12/2/2018	1159	F	2.3	Y	N	Y	N	N	5	Y	N	Y	Y	Y	Y	62	52	68	70	78					
83	41290	B/O RESHMA M KARJAL	20	39.5	Y	N	12/5/2018	1057	F	3.77	N	Y	N	N	N	>24	N	Y	Y	Y	Y	Y	71	64	66	71	68					
84	41702	B/O REKHA D KORI	22	38.4	N	Y	12/10/2018	1945	F	3	N	Y	N	N	N	>24	Y	N	Y	N	N	Y	58	57	79	73	65					
85	42010	B/O AMBUJA R CHOUDARI	24	38.2	N	Y	12/12/2018	1157	M	3.26	N	Y	N	N	N	6	N	Y	Y	Y	Y	Y	60	65	64	62	84					
86	42804	B/O RENUKA R DINDAWAR	30	38.2	Y	N	12/19/2018	1520	M	2.89	N	Y	N	N	N	>24	Y	Y	Y	Y	Y	Y	71	55	66	58	63					
87	43947	B/O ARCHANA A KUMBAR	22	40	N	Y	12/30/2018	1305	M	2.4	Y	N	Y	N	N	<1	N	N	Y	Y	N	Y	98	58	64	88	65					
88	434	B/O SANGEETA G KULKARNI	30	38.4	Y	N	1/4/2019	1148	F	3.4	N	Y	N	N	N	>24	Y	N	N	Y	Y	N	60	61	72	59	56					
89	818	B/O SUKHESHINI G MYALESHI	31	38.1	Y	N	1/7/2019	1139	M	3.55	N	Y	N	N	N	4	N	Y	Y	Y	Y	Y	57	53	52	67	80					
90	1681	B/O VIDYASHREE P KAMANE	30	38.3	N	Y	1/16/2019	1535	F	2.96	N	Y	N	N	N	8	Y	N	Y	N	Y	Y	52	59	53	59	46					
91	2229	B/O KAVITHA V BADIGER	27	38	Y	N	1/21/2019	1156	F	2.28	Y	N	Y	N	N	>24	Y	Y	Y	Y	Y	Y	40	59	63	54	61	Y	ASYMP	BF		
92	3639	B/O SUGABAI S DASHAVANT	31	38	N	Y	2/2/2019	1343	M	2.49	Y	N	Y	N	N	12	N	Y	Y	Y	N	Y	62	72	66	73	66					
93	4537	B/O CHANNAMMA C PUJARI	33	39.6	Y	N	2/10/2019	1226	F	2.4	Y	N	Y	N	Y	<1	N	Y	Y	N	Y	Y	108	76	88	79	76					
94	5353	B/O SHABANA I ATTAR	25	38	N	Y	2/18/2019	913	M	3.8	N	N	N	Y	N	>24	Y	N	Y	Y	N	Y	74	83	68	80	82					
95	6862	B/O NAZREEN D CHOUDARI	21	39	N	Y	3/4/2019	1210	F	4.05	N	N	N	Y	N	18	Y	Y	Y	Y	Y	Y	39	40	51	69	73	Y	ASYMP	BF+EBM		
96	7515	B/O VIJAYA;AXMI N GURAVIN	31	38	N	Y	3/9/2019	1536	F	2.3	Y	N	Y	N	N	>24	N	N	Y	Y	N	N	51	51	62	63	74					
97	7780	B/O RANI G DENGI	29	39.5	N	Y	3/12/2019	1414	F	2.75	N	Y	N	N	N	>24	N	Y	N	Y	Y	Y	36	46	65	78	51	Y	ASYMP	BF+EBM+RCM	42	58.7
98	8549	B/O SUJATA M KUMBAR	27	39.2	Y	N	3/19/2019	1136	M	2.86	N	Y	N	N	N	8	Y	N	Y	N	Y	Y	54	76	78	59	82					