



**ORIGINAL RESEARCH PAPER**

**Neonatology**

**EARLY DISCHARGE OF PRETERM INFANTS ON GAVAGE-FEEDING AND SHORT TERM OUTCOMES**

**KEY WORDS:** Early discharge, Gavage feeds, Preterm

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<b>ABSTRACT</b>	<b>Aim and Objectives:</b> To analyse short term outcomes of preterm neonates discharged on gavage feeds. Materials and <b>Methods:</b> Retrospective Cohort study of discharged neonates on gavage feeds. Outcome measures: To access mortality rate within 8 weeks after discharge and duration of hospital stay, re-admissions rates and anthropometry indices on follow-up.
	<b>Results:</b> There were no differences between the early- and routine-discharge groups in the mortality [1 (2%) vs 3 (6.2%), p=0.06] following discharge and re-admission rates [6 (12.5) vs 5 (10.4%)]. There was significant difference in the duration of stay in the two treatment groups (17 days vs. 28 days, p 0.02). At 38 weeks post-menstrual age, the rate of weight gain (mean 30 vs 33 g/kg/day, p=0.06) and head circumference growth (38.9 vs 39.5 cm, p=0.10) were similar in both groups.
	<b>Conclusion:</b> Early discharge of stable preterm infants on gavage feeding resulted in a reduction in length of hospitalization.

**INTRODUCTION:**

Early discharge of preterm infants from neonatal intensive care units presents an attractive strategy which could be particularly useful in low resource setting. Preterm neonates are discharged from hospital when they are transitioned to paladai feeds or direct breast feeds. Parents often request early discharge to reduce their financial stress, also it unites families sooner, improves mother-infant bonding and ensures that the father returns early to work. Early discharge of stable preterm babies still on gavage (tube) feeds is often required in resource poor set-ups. These infants later graduate to full sucking feeds at home with some professional support or come back to the hospital later for transitioning. However, this practice could present a burden for the family and might increase complications during the transition from tube feeding. Our NICU caters to the urban and rural lower middle class families, where for the aforementioned reasons, parents frequently request early discharge, even on gavage feeding. We analysed the follow up data of a cohort of babies, who were discharged before 34 weeks, on gavage feeds, over a 5-year period to study the implications of this practice.

**AIMS AND OBJECTIVES**

To study the rates of re-admissions/mortality and anthropometric parameters within 8 weeks after discharge in preterm (born <34 weeks) infants.

**MATERIALS AND METHODS**

This is a retrospective analysis of recorded data on all preterm infants discharged home from our NICU, between January 2012 to January 2017, on full enteral gavage feeds, and their follow-up. Infants on supplemental oxygen to be continued at home were also included in the study. Exclusion criteria included infants with congenital abnormalities, severe apnea, neurological impairment, feeding intolerance, an unwilling or incapable caregiver and documented discharged against medical advice. As per our NICU policy, discharge of preterm infants was done if stable and at a post-menstrual age of 34 weeks and weight of 1400 grams, if they were able to accept entire feed volume by paladai and demonstrated 3 days of steady weight gain. If parents request for early discharge, the

pros and cons of such a strategy was discussed with them and insistent parents were involved early in the gavage feeding regimen of their infant after the risk consent, while the associated morbidities were treated. Once stable, but transition to paladai feeds was not possible due to immaturity, they were discharged home and advised to continue gavage feeding at home. Mothers were trained for Basic resuscitation, tactile stimulation during apneas, temperature monitoring, kangaroo mother care, introduction of infant feeding tubes and nasal/oral suctioning of secretions. A registered nurse or social worker followed up these infants at weekly intervals, by telephonic conversations. They were also followed-up in outpatient department at 2 weekly intervals, where their anthropometric parameters were monitored. We also analyzed for graduation to paladai feeds during follow-up visits. Approval from the Hospital's Ethics Committee was obtained before starting the study. A control group of matched gestational age/ birth weight infants, who underwent discharge as per our hospital policy, on full sucking paladai feeds was chosen from our medical records. For each group, data on neonatal demographic characteristics and morbidities till discharge home were recorded. The data were expressed as number (%), or mean± Standard Deviation (SD), and median (Interquartile range: IQR). Statistical analysis was performed using SPSS software (Version 11.0; SPSS Inc., Chicago, IL). The outcome measure was re-admission, anthropometry and/or mortality within 8 weeks after discharge of all the eligible infants. The reasons for re-admission or mortality were also recorded. Where available, the following data were analyzed, confidence in handling the baby, experiences related to care, experiences related to infant health and parental anxiety.

**RESULTS:**

Data was retrieved from medical records of 48 infants discharged on full gavage feeds. The median (IQR) gestational age at birth was 30 (29,31) weeks and birth weight was 1010g(872,1113g). A similar gestational age and birth weight control group was also chosen. The Neonatal demographic characteristics of the two groups are presented in table 1.

**Table 1 : Neonatal Demographic Characteristics**

Variables	Group I n=48 Median(IQR)	Group II n=48 Median(IQR)
GA at birth (weeks)	30 (29, 1)	30 (29, 31)
Birth weight (grams)	1010 (872.5, 1113.75)	1076 (896, 1480)
GA at discharge (weeks)	32 (31, 33)	35 (34, 37)
Weight at discharge (grams)	1205 (1010, 1316)	1418 (1312, 1461)
Duration of stay (days)	17 (11, 25)	28 (21, 42)
IVH (%)	5 (10.4%)	4(8.3)
Proven Sepsis (%)	4(8.3)	8(16.6)
Apnea (%)	23(48)	19(40)
NEC ≥ 2	2 (4.1)	2 (4.1)

There was a significant difference in the duration of hospital stay in the two treatment groups (17 days vs. 28 days, p 0.02).

Re-admission rates over the 8 week period were 6(12.5) in group I and 5(10.4%) in group II. The difference in the proportion of babies re-admitted in the two groups was not statistically significant. The causes of re-admission in group I (early discharge group) were vomiting of feeds (n=4) and apneas (n=2). All re-admission in both the group happened in the first 2 weeks of admission. The scheduled 2 weekly visits were honored by 41(85%) and 36(75%) of mothers. There was no statistical significant difference (p 0.22). At 38 weeks post-menstrual age, the rate of weight gain (mean 30 v/s 33 g/kg/day, p=0.06) and head circumference growth (38.9 v/s 39.5 cm, p=0.10) were similar in both groups. At 38 weeks, the proportion of infants on paladai feeds and/or direct breast feeds was 46 (97%) and 45 (94%) respectively. There were no differences between the early- and routine-discharge groups in the mortality [1 (2%) v/s 3 (6.2%), p=0.06] following discharge.

**DISCUSSION AND CONCLUSION:**

Our study shows that early discharge of stable preterm infants with home continuation of gavage feeding resulted in a reduction in length of hospital stay. The early discharge program was not associated with any significant effects on post-discharge mortality, anthropometric parameters. Compliance with follow-up visits was also similar in early discharge and the standard discharge groups.

Discharge of physiologically stable preterm infants who still need gavage feeds has been reported (1). This model of care is based on the assumption that transition to full sucking feeds can be undertaken successfully at home with appropriate healthcare support. Potential benefits of this model of care are that uniting the family earlier may have positive impact on the infant's development, and costs for the health service may be reduced. Disadvantages arise from the increased burden on the family associated with higher level of care and possible complications associated with gavage feeding, for example, growth failure and aspiration pneumonia.

In some neonatal set-up, due to constraints of bed availability early home discharge of premature infants becomes a priority. Balancing the benefits versus risks of discharging ex-preterm (gestation <34 weeks) infants home especially after a prolonged stay in the NICU, is a tough task in a resource limited set up given the poor access to healthcare after discharge and the socio-economic status of the parents. Most neonatologists tend to be conservative in discharging such infants. Our results indicate the short term safety of early discharging preterm infants home on gavage feeds in our set up.

Mokhachane et al., (South Africa, 2006) assessed the outcomes of preterm very low birth weight (VLBW) infants discharged early at weight ≥1650g (n=62) compared with

≥1800g as per routine practice (n=62) in a Randomized Controlled Trial (RCT). They observed that the mortality, anthropometric parameters and the re-admission rates were similar in both groups. It was concluded that, if home circumstances are adequate, it is safe to discharge well, singleton VLBW infants from hospital at a weight of ≥1650g or ≥1800g (2).

Similar results were also shown by Singer et al (3), Cruz et al (4) and Ankit et al (5). The last mentioned study was a recent Indian study from a set up similar to ours. Ankit et al had studied two groups of discharged preterm infants of different gestational ages. Group I (n=54): 26-29 weeks, Group II (n=181): 30-34 weeks. The mean±(SD) duration of stay was 42±19 vs. 19±14 days in group I vs. II infants. Five (2.7%) infants were re-admitted within the first four weeks after discharge in group II; none in group I. They concluded that early home discharge for preterm infants born <34 weeks was feasible and safe in low resource setting.

The only other RCT which reported on early home gavage feeding in preterm infants was done by Örténstrand et al. This Swedish study involved 88 infants from 75 families (45 infants/40 families - experimental, 43 infants/35 families - control). Participants had mean gestational age at birth of 31.4 weeks (standard deviation (SD) 2.8) in the experimental group and 32 weeks (SD 2.3) in the control group. This trial compared early discharge with home visits by a registered nurse for infants still requiring special care (mainly gavage feeds) versus standard care (discharge home when clinically well and gaining weight satisfactorily on full sucking feeds). Infants were discharged from the home program when the ordinary criteria for hospital discharge were met. Evidence from this single included study showed early discharge with home support of gavage feeding for stable preterm infants resulted in a reduction in length of hospital stay and a decrease in the proportion of infants with clinically diagnosed infection. The home gavage program was not associated with any significant effect on duration or extent of breast feeding, weight gain, parental confidence and anxiety or health service use. The results of the RCT's and observational studies all demonstrate the short term benefits of early discharge on gavage feeds, similar to our study.

**Limitation of this study:**

Our study included a relatively small number of infants and was not randomized. This could have resulted in a selection bias that makes it difficult to assess the true benefits and risks associated with the early discharge program. Long term outcomes were not assessed.

**CONCLUSION:**

Our study suggests that early discharge with home continuation of gavage feeding for stable preterm infants was a safe, manageable option for infant and family, and may even be beneficial, though these results need to be interpreted with caution.

**Conflict of Interest:**None.

**“What this study adds”**

Early discharge of stable preterm infants on gavage feeds reduces the duration of hospital stay, early mother-infant bonding, thus having positive impact on developmental outcome and reduction in financial burden on the family in a low resource setting.

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