To study the Pattern of weight loss in Breast-feed Neonates in Initial 72 h of life

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Abstract :

Background : Neonates are expected to have weight loss in the first few days of life. Many factors are considered to affect newborn weight loss such as breast-feeding adequacy, maternal parity, intravenous fluids administered during labor, and environmental factors. Most of the studies have yielded variable results. The primary objective of this study was to assess the pattern of newborn weight loss in initial 72 h after birth and the factors affecting it. **Materials and Methods :** A study was carried out on 100 term exclusively breast-feed newborn babies. Neonates were weighed initially at birth and then regularly at 12 hourly intervals for 72 h. Data pertaining to various maternal factors affecting neonatal weight loss, birth weight of newborns, and adequacy of breast-feeding were recorded. **Results:** About 80% of babies lost 5%–10% of birth weight and 12% of babies lost morethan 10%. The maximum weight loss occurred between 60 and 72 h of life. The mean (standard deviation [SD]) percentage of weight loss in babies with inadequate breast-feeding was 9.0(2.58) compared to 7.3 (1.82) in the adequately breast-fed babies (P < 0.001). The mean (SD) percentage of weight loss in babies born to primipara was 8.4 (1.7) and in multipara it was 7.5 (2.4) (P = 0.005). Neonates who developed significant jaundice had a mean (SD) percentage weight loss of 9.8 (3.40) compared to the rest in whom it was 7.5 (1.92) (P < 0.001). **Conclusion:** Regular monitoring of weight in exclusively breastfed babies is potentially useful. Particular attention may need to be given to primipara mothers and babies who lose more than 10% weight by 72 h.

Keywords: Exclusively breastfed, newborn, weight loss

Introduction : Newborns the first feware days expected of life, to and have there weight are loss various in putative mechanisms proposed for the same. They have an expanded extracellular compartment (ECF) compartment at birth due to various maternal, fetal, and placental factors. The weight loss is primarily due to the contraction of this expanded ECF compartment.[1] In the immediate postnatal period, changes such as oxygenation increase in capillary membrane integrity leads to movement of fluid from interstitial space into the vessels. This aids in maintaining intravascular volume during the first 24–48 h when oral fluid intake may be limited. Many factors may affect newborn weight loss such as parity of the mother, intravenous (IV) fluids administered during labor, and breast-feeding adequacy. The extent of this weight loss and the factors associated with it has been a subject of study for many years. The current clinical practice guidelines vary, with some recommending interventions, including extra assessments or supplementation with formula, when total weight loss exceeds 7% and others identify a loss of $\geqslant$ 10% as a sign of breastfeeding inadequacy.[2]

In one landmark study done by MacDonald et al., [3] where they followed infants for 14 days, the infants were weighed daily while in hospital but intermittently after discharge. Based on the results of this study, it appeared that weight loss of up to 12% of birth weight is experienced by about 95% of neonates, and on an average, newborns started gaining weight by day 4 and regained their birth weight by day 9.

In various studies including a systematic review done by Noel-Weiss et al.,[4] it was found that median percentage of weight loss ranged from 3.2

to 8.3, with the majority of reported medians around 6%. Studies have also been done to look for any factor which might affect weight loss in neonates apart from breastfeeding, with differing results. These include factors such as parity, mode of delivery, IV fluids administered during cesarean section, maternal illnesses, perinatal complications, and environmental factors.[5]

Studies from Indian subcontinent on the subject are few.In one such study done by Bhat et al.[6] on exclusively breastfed, term, healthy babies, the weight loss was significant in 6.8% of babies (>10%), 24.7% of babies lost >5%, and in the remaining weight loss was not significant (<5%).

In view of the variability of findings in the different studies and a paucity of data from Indian subcontinent on the subject, the present study was undertaken to explore the pattern of weight loss and the factors responsible for the same in the neonate in initial 72 h of life.

Materials and Methods : A prospective observational study was conducted in a tertiary care hospital from December 2014 to March 2016 to ascertain the neonatal weight loss in initial 72 h of life and the various factors affecting it and its effect on neonatal jaundice .One hundred, healthy exclusively breastfed newborn babies were enrolled in the study. Babies who required resuscitation, received IV fluids or top feeds or phototherapy in the first 72 h, or were unwell due to any reason were excluded from the study. Data pertaining to various maternal factors such as parity, mode of delivery, fluids received by mothers 2 h before delivery, and adequacy of breastfeeds as ascertained by asking mothers regarding (i) number of times the baby was fed (minimum eight times), (ii) feeling of emptying of breasts after feeding,(iii) whether baby slept well after feeds, and (iv) passed adequate urine were recorded in a predesigned pro forma. Neonates were weighed initially at birth by a digital weighing machine (Gold tech Digital Weighing Scale, Precision Electronic Instruments Company, New Delhi, India) and then regularly at 12 hourly intervals for 72 h along with measurement of urine and stool output. The weight on the 10th day was recorded on the same scale by recalling them to hospital. This weighing scale was used throughout the study. The pattern of weight loss and the association of various factors with newborn weight loss were studied. Descriptive and inferential statistical analysis was carried out in the present study. Results on continuous measurements were calculated as mean ± standard deviation (SD) and results on categorical measurements as number (%). Significance was assessed at 5% level of significance. Analysis of variance was used to find the significance of study parameters between three or more groups of patients, and Student's t-test (two-tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (intergroup analysis) on metric parameters.

Results : The profile of study population is depicted in Table 1. Neonates were weighed regularly at 12 hourly intervals for 72 h along with measurement of urine and stooloutput. In our study, 8% of babies lost <5% of their birth weight, majority of babies (80%) lost 5%–10%, and 12% of babies lost more than 10% of weight at 72 h compared to birth weight. The pattern of weight loss across 72 h is shown in Figure 1.

Sr. No	Parameters	Distribution (%)
1	**Gravida**	
	Primipara	40
	Multipara	60
2	**Modes of Delivery**	
	SVD	70
	LSCS	30
3	**IV fluids given to mother(ml)**	
	<500	53
	500-1000	26
	>1000	19
4	**Birth weight distribution (g)**	
	<2500	6
	2500-3500	88
	>3500	6

Table 1- Demographic profile of study population

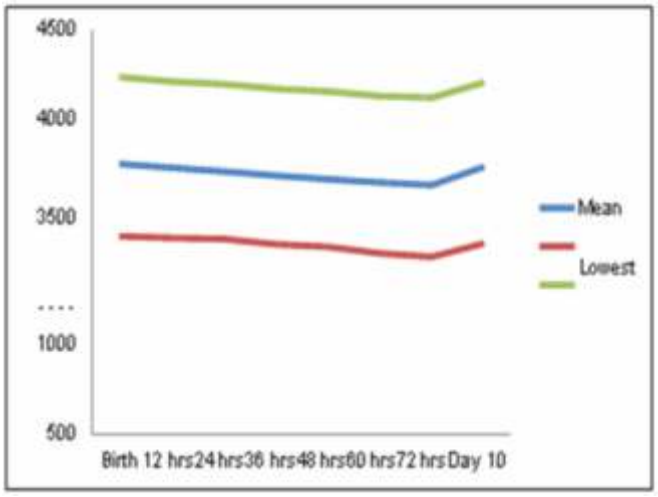

Figure 1- Pattern of weight loss across 72 hrs

There was a uniform loss of weight over 72 h. The highest weight loss was around 60–72 h of life. The association of various factors such as parity, mode of delivery, IV fluids administered to mother 2 h before delivery, initial birth weight, and breast-feeding adequacy was studied and is shown in Table 2.

Sr. No	Parameters	Percentage of weight loss
1	**Parity**	
	Primi	8.4
	Multi	7.5
2	**Modes of Delivery**	
	SVD	7.8
	LSCS	7.9
3	**IV fluids given to mother(ml)**	
	<500	7.85
	500-1000	7.55
	>1000	8.1
4	**Birth weight distribution (g)**	
	<2500	8.8
	2500-3500	7.8
	>3500	7.2
5	**Adequacy of Breast-feeding(%)**	
	Inadequate	9.0
	Adequate	7.3

Table 2- Association of various factors

The mean (SD) percentage of weight loss in babies born to primi and who were not adequately breast-fed was statistically more significant than their respective counterparts. Percentage of weight loss was more in babies born by lower segment cesarean section (LSCS) and where mothers received more than 1000 ml of fluids 2 h before delivery but statistically it was not significant. The weight loss was more in babies <2500 g; however, this too was statistically not significant. Out of 100 babies, 10 (10.4%) had significant jaundice with mean (SD) percentage of weight loss of 9.87 (3.40) and of the remaining 90 babies who did not have significant jaundice, the mean (SD) percentage of weight loss was 7.59 (1.92) and this was statistically significant ($P < 0.001$) (95% confidence interval [CI]: 8.49–11.25 and 7.34–7.84, respectively). Jaundice beyond 72 h was taken as significant if it required intervention like phototherapy based on the standard nomogram.[1] In the study group, 86 babies had <10% of weight loss and 14 babies had>10% of weight loss. Out of 86 babies who had lost <10% of birth weight, (45%) regained birth weight by day 10. And of the remaining 14 babies who had lost>10% of birth weight, only 2 babies (11.8%) regained birth weight by day 10. Thus, majority of babies who had lost >10% of birth weight did not regain birth weight by day 10, which was statistically significant with $P = 0.0003$.

Discussion : In this present study, 8%, 80%, and 12% of babies lost up to 5%, 5%–10%, and more than 10% of birth weight, respectively, and the mean (SD) percentage of weight loss was 7.8 (2.22). The weight loss and its pattern in our study are similar to what has been described earlier. However, in our study, 12.8% of babies lost more than 10% of their weight. This may have been because our hospital is a certified baby friendly hospital which insists on exclusive breastfeeding of all neonates.

In various studies including a systematic review done by Noel Weiss et al.[4] which included 11 studies, in which definitions, types of measurements, and reporting styles varied among studies, daily weights were not measured, and measurements did not continue for 2 weeks.

Mean weight loss ranged from 5.7% to 6.6%, with SDs around 2%. Median percentage of weight loss ranged from 3.2 to 8.3, with the majority around 6%. The majority of infants in these 11 studies regained their birth weight within the first 2 weeks of life. The 2nd and 3rd days following birth appeared to be the days of maximum weight loss.

In an Indian study done by Bhat et al.[6] on exclusively breastfed, term, healthy babies, the weight loss was significant in 6.8% of babies (>10%), 24.7% of babies lost >5%, and in the remaining weight loss was not significant (<5%). In our study, the mean (SD) percentage of weight loss in babies born to primipara was 8.31 (1.77), which was statistically more significant than in multipara in which it was 7.51 (2.43) with P = 0.005.

In many other studies too done to ascertain factors affecting neonatal weight loss, it was found that babies born to primipara lose more weight compared to babies born to multigravida.[4,7-9] The effect of mode of delivery and IV fluids administered to mother during delivery on neonatal weight loss has been studied by many authors. Two studies in the literature done by Lamp and Macke [10] and Watson et al.[11] showed that there is no positive correlation between fluids administered to mother and neonatal weight loss. In another two studies done by Chantry et al. [12] and Mulder et al.[13], it was found that increased intrapartum IV fluids impacted neonatal weight loss in the first few day of life. In our study, mean (SD) percentage of weight loss in babies, where mother received IV fluids ≤500 ml, 500–1000 ml, and >1000 ml 2 h before delivery, was 7.85 (2.44), 7.55 (1.87), and 8.1 (2.00), respectively. Although percentage of weight loss was more in babies where mother received more than 1000 ml of fluids, statistically it was not significant with P = 0.278. Thus, we did not find any positive correlation between IV fluids administered during labor and neonatal weight loss.

With respect to the mode of delivery, weight loss was more in babies born by LSCS but statistically it was not significant, with P = 0.917. The effect of inadequate breastfeeding on neonatal weight loss has been studied by many authors. In one such study, it was found that inadequate feeding will lead to excessive weight loss, later to complications such as fever, hypernatremia, and jaundice.[14]

In our study, breast-feeding was found to be inadequate in 30.4% of babies, and the mean (SD) percentage of weight loss in these babies was 9.01 (2.58). In 69.6% of babies, breast-feeding was adequate and mean (SD) percentage of weight loss in these babies was 7.31 (1.82) and this was significantly different (P < 0.001). Out of 250 babies, 26 (10.4%) had significant jaundice with mean (SD) percentage of weight loss of 9.87 (3.40) and of the remaining 224 babies who did not have significant jaundice, the mean (SD) percentage of weight loss was 7.59 (1.92), which was statistically significant (P < 0.001). Moreover, the remaining 34 babies who had lost >10% of birth weight, only four babies (11.8%) regained birth weight by day 10. Thus, majority of babies who had lost >10% of birth weight did not regain birth weight by day 10, which was statistically significant with P = 0.0003. Thus, in our study, major risk factors for excessive weight loss were primiparity and inadequate breast-feeding. We did not find any statistically significant association between mode of delivery and fluids administered to mother during labor on neonatal weight loss. Almost 12.8% of babies lost more than 10% of their weight which was higher than in earlier studies. Neonates who developed significant jaundice beyond 72 h had more weight loss than the rest. We found a positive association between excessive weight loss (>10%) in initial 72 h and failure to regain birth weight by day 10.

Conclusion : Routine weighing of exclusively breast-fed babies may be very useful to monitor breast-feeding adequacy and to avoid untoward effects of excessive weight loss. This is especially important for primi mothers who may initially face problems in feeding. Follow up is also important in babies who lose >10% weight in initial 72 h. Our study interpretation may be limited by the sample size, and hence, similar studies using a larger cohort of babies in a given geographical area may be conducted to validate the same.

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