

Clinical and laboratory observations

Breast-feeding, weight loss, and jaundice

M. Jeffrey Maisels, M.B., B.Ch., and Kathleen Gifford, R.N.C. Hershey, Pa.

INITIATION AND MAINTENANCE of successful lactation requires that a mother has the desire to breast-feed and that informed and enthusiastic professional support is available to her. Apart from potential problems associated with the technique of nursing, there are three conditions that, not infrequently, concern both mother and physician: excessive weight loss, "dehydration fever," and jaundice. Surprisingly little information is available on the normal weight loss to be expected for fully breast-fed infants, particularly when babies are divided into weight groups. Two recent texts dealing with the subject of breast-feeding fail to provide any data on this subject.^{1,2} Furthermore, it is unclear whether the fever that occurs occasionally in breast-fed infants is related to undernutrition or to dehydration.³ If "breast milk fever" is in fact related to poor intake, documentation of excessive weight loss would permit the problem to be anticipated, thus avoiding unnecessary investigations and, on occasion, admission to a neonatal intensive care unit. We investigated the weight loss experienced by fully breast-fed infants and its association with jaundice and fever.

From the Division of Newborn Medicine, Department of Pediatrics, The Milton S. Hershey Medical Center, The Pennsylvania State University.

Reprint address: M. Jeffrey Maisels, M.D., Department of Pediatrics, The Milton S. Hershey Medical Center, Hershey, PA 17033.

Table. Cumulative weight loss by day 3 and total serum bilirubin concentrations

Birth weight (gm)	Cumulative weight loss Day 3 (%)	Serum bilirubin Day 3 (mg/dl)
2501 to 3000	5.4 ± 3.3	7.5 ± 3.5
3001 to 3500	5.9 ± 3.3	7.0 ± 3.4
3501 to 4000	6.0 ± 3.2	6.2 ± 3.6
> 4000	6.0 ± 3.0	7.1 ± 3.7

Values are means ± SD.

METHODS

We reviewed the charts of 100 infants from the well-baby nursery of The Milton S. Hershey Medical Center. Consecutive charts were examined until 25 infants in each of four weight groups had been identified: birthweight 2,501 to 3,000 gm, 3,001 to 3,500 gm, 3,501 to 4,000 gm, and > 4,000 gm. Infants were selected only if they had been delivered vaginally, had been fully breast-fed, and had received no supplementation with water or formula. All infants nursed from their mothers soon after birth and were breast-fed subsequently on demand. Changes in weight were charted over the first three days of life. Because most infants had been discharged by the fourth day, the numbers were too small to provide longitudinal data beyond day 3.

Axillary temperatures were obtained every eight hours

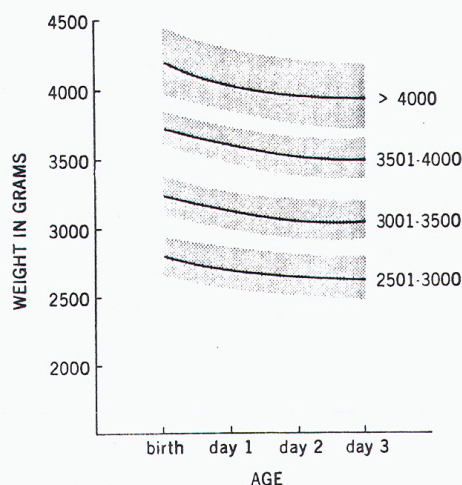


Figure. Changes in birth weight for 100 fully breast-fed healthy infants ($n = 25$ for each weight group). Line, mean; shaded areas, 1 SD from the mean (smoothed curves).

on all infants, using a glass clinical thermometer held in the axilla (with the infant's arm held closely to its side) for at least three minutes.

All infants had a serum bilirubin determination on the third day of life. Total serum bilirubin concentration was measured by a modified diazo method using the DuPont Automatic Clinical Analyzer, (ACA III Instruction Manual, The DuPont Co., Clinical Systems Division, Wilmington, De.). At serum bilirubin concentrations of 2.5, 4.2, and 19.4 mg/dl (Omega chemistry control sera, Hyland Diagnostics Corp., Bannockburn, Ill.), 30 repeat determinations revealed standard deviations of 0.1, 0.18, and 0.3 mg/dl, with coefficients of variation 4.6, 4.2, and 1.5%, respectively.

RESULTS

The Table and Figure show the changes in birth weight and cumulative weight loss for the infants in each weight group. The mean weight loss for all infants was $5.8 \pm 3.2\%$ (range 1.4 to 13.4%); seven infants lost $> 10\%$ of their birth weight. There were no significant differences in cumulative weight loss between any of the groups. The mean serum bilirubin concentration on day 3 was 7 ± 3.6 mg/dl (range 0.5 to 15 mg/dl); three infants had values > 12.9 mg/dl. Their bilirubin concentrations were 13.3, 13.9, and 15 mg/dl, and their weight losses 7.8, 5.2, and 4.2%, respectively. There were no significant differences in

the mean serum bilirubin concentrations between groups. When all serum bilirubin values were plotted against the cumulative weight loss for each infant, no relationship was found.

Three of the infants had one or more axillary temperature measurements ≥ 37.5 C. They were in three different weight groups; their percentage weight losses were 1.5, 4.1, and 6.9%, and their maximum bilirubin concentrations were 6.8, 8, and 8.5 mg/dl, respectively.

DISCUSSION

These data provide the changes in birth weight to be expected during the first three days of life in fully breast-fed infants of different birth weights. As the average weight loss for all groups was $5.8 \pm 3.2\%$ (SD), we cannot agree with the suggestion that a weight loss in excess of 5% requires evaluation.¹ Rather, a weight loss of more than 12% of birth weight (> 2 SD above the mean) can be considered excessive. Those infants who became febrile did not have an excessive weight loss and therefore could not have been identified earlier as infants likely to develop "breast milk fever." Dahms et al.³ observed elevated temperatures in seven of 56 breast-fed infants (12%), whereas this occurred in only 3% of our infants. The pathogenesis of breast milk fever remains unclear. Our results and those of Dahms et al.³ do not support the contention that breast milk fever is related to dehydration. Nevertheless, in the experience of most physicians, supplementation with water does alleviate the problem, and in Dahms' study none of the infants given supplementation or formula became febrile.³

Because of the widely held belief that neonatal jaundice is associated with inadequate intake, breast-fed infants who become jaundiced frequently receive supplements of formula and water. We could find no relationship, however, between serum bilirubin concentrations and weight loss. Furthermore, De Carvalho et al.⁴ found no difference in peak serum bilirubin values between infants who were fully breast-fed and those who received water supplementation.

REFERENCES

1. Lawrence RA: Breast feeding: A guide for the medical profession. St. Louis, 1980, CV Mosby.
2. Goldfarb J, Tibbetts E: Breastfeeding handbook: A practical reference for physicians, nurses and other health professionals. Hillside, N.J., 1980, Enslow Publishers.
3. Dahms BB, Krauss AN, Gartner LM, Klain DB, Soodalter J, Auld PAM: Breast feeding and serum bilirubin values during the first four days of life. *J PEDIATR* 83:1049, 1973.
4. De Carvalho M, Hall M, Harvey D: Effects of water supplementation on physiological jaundice in breast-fed babies. *Arch Dis Child* 56:568, 1981.