Cup-feeding versus other forms of supplemental enteral feeding for newborn infants unable to fully breastfeed

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This Cochrane review found that, compared with bottle-feeding, cup-feeding confers no significant benefit in maintaining breastfeeding beyond discharge from hospital. Moreover, cup-feeding was associated with a longer stay in hospital for infants. However, these findings may not be applicable to under-resourced settings since most of the studies included in the review had been conducted in hospitals in developed countries, and the number of infants studied was relatively small to yield reliable results from a meta-analysis.

RHL Commentary by Han AM

1. INTRODUCTION

Breastfeeding is the best way of feeding newborn infants. However, in many instances mothers are unable to breastfeed their newborns, especially when the baby is small for age or sick. Worldwide, only 34% of infants less than 6 months old are exclusively breastfed, with the figures ranging from 43.2% for the South-east Asia region to 17.7% in Europe (1). Low prevalence of breastfeeding is a major problem across the globe, and alternative methods of enteral feeding (with bottle, gastric tube or cup) are in use to feed infants who are unable to breastfeed. Especially in under-resourced settings, bottle-feeding has its own disadvantages, namely risk of infection, nipple confusion in the infant, high cost, etc. Feeding infants by gastric tube needs proper training, and tubes are not readily available in all settings, especially in low-income countries. The Baby-friendly Hospital Initiative guidelines recommend the use of cup-feeding for infants who are expected to be breastfed once they are able to do so (2). However, cup-feeding has been associated with the risk of aspiration, longer feeding time and milk wastage. It was therefore essential to perform a systematic review of the different methods of supplemental feeding in newborn infants. The objectives of this Cochrane review (3) were to determine the effects of cup-feeding versus other forms of supplemental enteral feeding on weight gain and achievement of successful breastfeeding in newborn infants who are unable to breastfeed fully.

2. METHODS OF THE REVIEW

The authors used a comprehensive search strategy and searched databases such as the Cochrane Central Register of Controlled Trials, CINAHL (1987 to April 2006) and Medline (1966 to April 2006) for randomized and quasi-randomized controlled trials. In the review, the authors present comprehensive details of the characteristics of the included and excluded trials, as well as how the data were analysed.

The primary outcome measures were: weight gain, time taken to achieve full breastfeeding with acceptable
weight gain, proportion not breastfeeding/not fully breastfeeding at discharge from hospital and at three months and six months of age. Secondary outcomes like average time per feed, physiological instability events and length of hospital stay were also determined.

3. RESULTS OF THE REVIEW

Four studies (with 472 infants) were eligible for this review. The participants in the studies included preterm infants with a mean gestational age between 29 and 35 weeks. The effects of supplemental feeding with cup versus bottle-feeding were compared.

3.1 Primary outcome measures

Weight gain, measured as grams/kg/day, was reported only in one study and did not show a significant relationship with either of the two methods of supplementary feeding (cup-feeding and bottle-feeding). For babies in two feeding groups, the incidence rates were not statistically significant for those not breastfeeding at discharge from hospital and at 3 months (two studies, 402 infants) and 6 months (one study, 319 infants). When the proportion of babies not fully breastfeeding was studied, the group fed with cup had a better outcome than bottle-fed infants at discharge from hospital, which was statistically significant [relative risk (RR) 0.75, 95% confidence interval (CI) 0.61–0.92]. However, this difference was not statistically significant at 3 months and 6 months.

3.2 Secondary outcomes

There was no significant difference in the average time per feed in infants fed with either cup or bottle. There was also no statistically significant difference between the two groups in terms of episodes of oxygen desaturation during feeding (only one study had reported this finding).

A statistically significant increase in 10 days of hospital stay was reported in one study for infants fed with a cup (mean difference between groups was 10.1 days with the 95% confidence interval of 3.9–16.3), but the other three did not report this outcome.

Other secondary outcomes such as choking events, infection events, postnatal age at discharge, cost, parental satisfaction and anxiety, neurodevelopmental outcomes and deaths were not reported in any of the four studies.

4. DISCUSSION

4.1 Applicability of the results

This Cochrane review concludes that 'cup feeding cannot be recommended over bottle feeding' based on the finding that the former confers no significant benefit in maintaining breastfeeding beyond discharge from hospital and that cup-feeding carries the unacceptable consequence of a longer stay in hospital. However, this conclusion may not be applicable to under-resourced settings. Firstly, the studies reviewed were mostly conducted in developed countries in hospital settings and involved only pre-term infants. Secondly, the number of infants studied was relatively small to yield meaningful results from a meta-analysis (4). Thirdly, since follow-up of infants was reported only in two of the four studies reviewed, the available data on proportions of infants breastfeeding at various times at discharge may not reflect the true situation. Two studies in developing countries (5, 6) have suggested beneficial effects of cup-feeding over bottle-feeding in both pre-term and term infants cared for in hospital as well as in the community. Breast- and cup-feeding groups have also been reported to have similar outcome indicators such as infant sucking behaviour (during attempts to latch onto the breast) and maternal milk supply (6).

With regard to the finding of longer hospital stay in the cup-feeding group, this result was reported by only
one study. Pre-term babies included in this study were younger in terms of gestational age than infants in the other three studies, and there was reported poor compliance with cup-feeding in this study owing to unfamiliarity of the health-care staff in most of participating hospitals with the method of cup-feeding. This could have resulted in a bias in the findings.

4.2 Implementation of the intervention

Since this review does not recommend cup-feeding for supplemental enteral feeding, the choices left are bottle-feeding or gastric-tube feeding. With regard to the former, policies and procedures will need to be strengthened in health-care facilities to overcome the problems of hygiene associated with bottle-feeding. Problems of hygiene and costs associated with bottle-feeding in the community will be more difficult to resolve. As to feeding by gastric tube, health-care staff will need to be appropriately trained and supplies of gastric tubes will need to be assured. It should be noted, however, that feeding with gastric tube will not be feasible outside the hospital. Overall, implementing the findings of this review in under-resourced settings will be very difficult until there is a considerable rise in funding for the health sector and in public knowledge about health and hygiene.

4.3 Implications for research

Well controlled randomized studies on cup-feeding versus other methods of supplemental feeding (bottle-feeding, spoon-feeding, etc.) should be undertaken on a wider scale in under-resourced settings. Secondary outcome measures in such studies should include incidence of aspiration, physiological instability, parental satisfaction and anxiety, and neurodevelopmental outcomes.

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References

- UNICEF. Breastfeeding management and promotion in a Baby Friendly Hospital, an 18 hour course for maternity staff. New York: UNICEF; 1993.

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