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NUTRITION

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For the Neonatal Study Group

UNICEF/WHO baby-friendly hospital initiative: does the use of bottles and pacifiers in the neonatal nursery prevent successful breastfeeding?

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Abstract To promote breastfeeding, UNICEF/WHO have launched the "baby-friendly hospital initiative" focusing on hospital care routines during delivery and the first days of life. In industrialised countries, two aspects of the initiative have raised controversy: how do restriction of supplemental feedings and ban of bottles and pacifiers affect long-term breastfeeding performance? From ten centres 602 healthy newborns were randomly assigned either to a UNICEF group with restrictive fluid supplements and avoidance of bottles and pacifiers during the first 5 days of life, or to a standard group with conventional feeding practice. Breastfeeding was encouraged in both groups. The main study endpoints were the prevalences of breast-feeding on day 5, and after 2, 4 and 6 months. Of the newborns 46% violated the UNICEF protocol, mostly because of maternal requests to give a pacifier or supplements by bottle. In the standard group, the drop-out rate was 9.7%. No significant differences in breastfeeding frequency and duration could be found: (UNICEF vs standard) day 5: 100% vs 99%; 2 months: 88% vs 88%; 4 months: 75% vs 71%; 6 months: 57% vs 55%. Inclusion of drop-outs due to pacifier use did not alter the results.

Conclusion In our study population fluid supplements offered by bottle with or without the use of pacifiers during the first 5 days of life were not associated with a lower frequency or shorter duration of breastfeeding during the first 6 months of life.

Key words Breastfeeding · Supplementary feeding · Neonatal · Bottles · Pacifier use

Abbreviation *DM* 10% dextrin-maltose-solution

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Introduction

Since the early 1990s UNICEF/WHO have been awarding the title of "baby-friendly hospital" to maternity services which followed their promotional programme "ten steps to successful breastfeeding" [25]. Eight of the ten steps focus on education, motivation and attitude of parents and healthcare staff regarding breastfeeding, as well as hospital care routines which allow the baby to breastfeed immediately after delivery. Rooming-in of mother and child, and availability of professional breastfeeding counselling are additional elements proposed by the initiative. Studies and experience provide evidence of the validity of these steps [12, 15, 16, 20, 27, 28]. Certain difficulties arise, however, in industrialised countries with regard to steps 6 and 9:

> Step 6: Give newborn infants no food or drink other than breast milk, unless medically indicated.
> Step 9: Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

In countries with low hygienic standards, the risk of infection by contaminated bottles, pacifiers and supplemental liquids justifies these two steps. Furthermore, supplemental feeding during the 1st week of life may negatively affect breastfeeding. However, the published results may have been biased as they were derived from retrospective or non-randomised studies [2, 4, 13, 27]. The question also remains whether the use of baby-bottle teats or pacifiers is a symptom or a cause of sucking difficulties or so-called "nipple confusion" [5, 18, 23]. The purpose of this study was to examine the need for strict adherence to steps 6 and 9 of the UNICEF guidelines in industrialised countries.

Subjects and methods

Maternity services of ten Swiss hospitals agreed to participate in this multicentre prospective randomized trial. After obtaining pa-

rental consent, eligible healthy newborns were randomly assigned to one of the following two groups during their hospital stay:

1. *UNICEF* group: supplements, if medically indicated, were administered by cup or spoon; bottles, teats and pacifiers were strictly forbidden.
2. *Standard* group: supplements were conventionally offered by bottle after breastfeeding [22]; pacifiers were offered to all infants without restriction.

In both groups, the fluid supplements during the first few days consisted of a 10% dextrin-maltose-solution (DM). Fluid supplements were considered to be medically indicated in the following situations: babies agitated or screaming after breastfeeding; signs of dehydration (no urine output over 4 h after day 1); symptoms of hypoglycaemia with blood glucose < 2 mmol/l. In the standard group fluids were more liberally offered (e.g. once or twice a day).

Infant formula was allowed only from day 4–5 if the baby had lost $> 8\%$ of his/her birth weight and if there was evidence of insufficient lactogenesis.

In order to be allowed to participate, hospitals were required to have established functioning breastfeeding programmes with early initiation of breastfeeding, lactation consultants, unrestricted rooming-in, as well as a policy of restricted use of infant formula supplements. Only healthy full-term infants (>37 weeks of gestation, 2750–4200 g) of mothers who intended to stay in the hospital for 5 days postpartum and planned to breast-feed for ≥3 months were eligible. Upon discharge from the hospital, it was left to the mothers of both groups to decide, whether to use a pacifier and/or bottle.

Before the initiation of the study, one of the authors (O.T.) and a lactation consultant visited the ten participating institutions to explain the purpose of the study, and the technique of cup [14] and spoon feeding. Sealed protocol forms were centrally randomized and distributed to each centre.

Data collection

Frequency of breastfeeding, DM or infant formula supplementation, weight and phototherapy were recorded daily for 5 days. Sucking behaviour was subjectively judged by the nurse in charge of the mother as good, mediocre or insufficient.

Questionnaires were sent to mothers at 2, 4 and 6 months to request feedback on: breastfeeding, introduction of supplementary nutrition and use of pacifiers.

For data analysis the following definitions were used: fully breast-fed meant feeding with breast milk only or with breast milk and nutritionally insignificant amounts of water-based liquids according to WHO definitions [26]; partially breast-fed meant feeding predominantly with breast milk with additional formula or beikust.

Statistics

Assuming a breastfeeding rate of 90% in the standard group at 2 months of life, we estimated that 235 infants would have to be randomized to each group of the study to detect a 10% difference with a power of 0.95 at ($\beta = 0.05$) [3]. In anticipation of frequent protocol violations we enrolled a total of 600 infants. The two groups were statistically compared by Student's *t*-test and Mann-Whitney U-Test. Pearson's chi-square test was used for categorical data. Data are expressed as mean ± SD. $P < 0.05$ were considered significant. The computer package SPSS, version 5.0.1 was used.

Results

A total of 602 infants met eligibility criteria and were enrolled after parental consent was obtained. The characteristics of the study population and their distribution within the two groups are given in Table 1. There was a high rate of protocol violations in the UNICEF group: In 9.5% of the cases cup or spoon feeding proved to be too difficult or the mother preferred to give fluid supplements by bottle. In 23.8% of the cases the mother wanted to use a pacifier; a 6-month follow up of this latter group of 70 infants was also done.

Table 1 Characteristics of the study population

	UNICEF	standard
Involved mother-child-pairs	294	308
Boys (%)	52.8	45.4
Birth weight (g ± SD)	3367 ± 319	3404 ± 348
Gestational age (weeks ± SD)	39.9 ± 1.4	39.9 ± 1.2
Maternal age (years ± SD)	30.8 ± 4	31.0 ± 4
Parity (birth ± SD)	1.7 ± 0.7	1.8 ± 0.8
Caesarean section (%)	10.1	10.2
Protocol violations (1st week)	114	17
– mother requested bottle	–19	
– mother requested pacifier	–70	
– failure to spoon/cup-feed	–9	
– early discharge	–6	–11
– others	–10	–6
Lost to follow up	23	13

During the first 5 days, virtually all children were sucessfully breast-fed (Fig. 1). Although in both groups most of the children received one or more supplements of DM solution, the total number of additional DM feedings during the first 5 days was significantly lower in the UNICEF group (6.1, range 0–18 vs 7.3, range 0–24; $P < 0.019$, Mann-Whitney U-Test) (Table 2). Infant formula was given to 2.8% of the infants in the UNI-

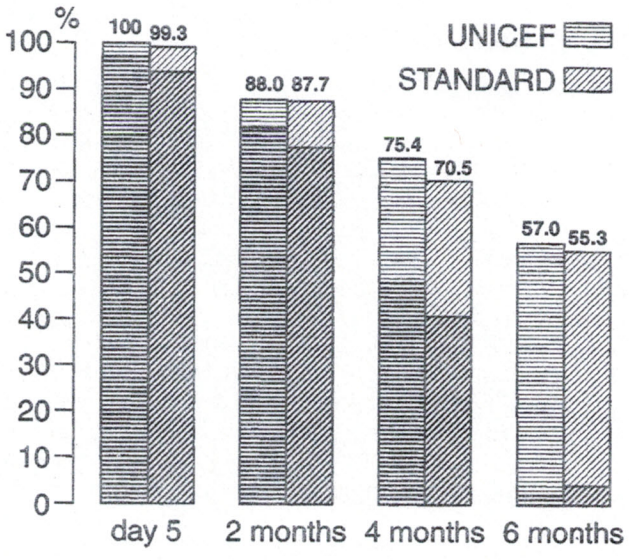

Fig. 1 Incidence of breastfeeding at day 5 and at age 2, 4 and 6 months. UNICEF group: restrictive supplemental fluids (if indicated given by spoon or cup), no bottles or pacifiers allowed. Standard group: supplements conventionally offered by bottle, unrestricted use of pacifiers. *Dark bars* indicate fully breast-fed, *light bars* partially breast-fed. There is no significant difference