The Baby-Friendly Hospital Initiative and breastfeeding in a neonatal unit

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Abstract

Objective
To evaluate the impact of the Baby-Friendly Hospital Initiative on breastfeeding practices among newborns admitted to a neonatal unit, during hospitalization and during the first six months of life.

Methods
The medical records of all newborns admitted to the neonatal unit of a teaching hospital in 1994 (N=285) and 1998 (N=368) were reviewed, and information on the infants' feeding practices during hospitalization and during the first six months of life was analyzed. The duration of breastfeeding and exclusive breastfeeding and the differences between the two years were assessed using the Kaplan-Meier technique and the Log-Rank test. Logistic regression and Cox analysis were performed for confounder control.

Results
There was an important increase in the percentage of infants given breast milk exclusively (1.9% in 1994 to 41.7% in 1998) during hospitalization, and feeding with formula alone, observed in 17.7% of infants in 1994, was no longer noted in 1998. With respect to breastfeeding practices during the first six months of life, the median duration of exclusive breastfeeding increased from 12 days in 1994 to 45 days in 1998. As to breastfeeding, which includes the ingestion of other types of food, no significant difference was observed.

Conclusions
The implementation of the initiative in the studied hospital contributed towards an increase in the exclusive breastfeeding of newborn babies during neonatal unit admission and during the first six months of life.

INTRODUCTION

In light of the numerous benefits of human milk, breastfeeding is the best means of feeding the infant child. Mothers must be oriented to breastfeed their children exclusively – that is, without other complementary foods – until the sixth month of life. After this age, complementation with other foods rich in iron, vitamins, and other nutrients becomes necessary, but breastfeeding should be maintained, preferably until the age of 24 months, or even later.[7,12]

The appropriateness and the benefits of breast milk extend also to preterm infants with low birth weight as well as to infants requiring admission to neonatal care units. However, experience has shown that the mothers of such children face substantial difficulties when attempting at achieving sustained breastfeeding, for a large share of these infants remain hospitalized in neonatal care units for extended periods, and suffer from suction deficiencies due to the immaturity of this reflex at birth. The initial separation also hinders mother-child bonding, an essential factor in

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successful breastfeeding (BF).[9,13] Additionally, the physical arrangement of maternities, their routines, and healthcare professionals' insufficient knowledge of breastfeeding have a negative influence on the success of breastfeeding initiation, favoring termination while still in the hospital.[10,11]

In this context, the Baby Friendly Hospital Initiative (BFHI) was introduced as a means of mobilizing healthcare professionals in favor of breastfeeding. BFHI is a global strategy sponsored by the World Health Organization (WHO) and Unicef, aimed at promoting, protecting, and supporting breastfeeding through the establishment, in hospitals, of pro-breastfeeding measures known as the 'Ten Steps to Successful Breastfeeding'.

In the city of Londrina, in southern Brazil, the BFHI was implemented in three hospitals. This initiative is believed to have greatly contributed towards the changing of hospital practices and routines related to breastfeeding. However, as in many other places, there were no studies evaluating the contribution of this initiative to children requiring intensive care, who were admitted to intensive care/treatment units (neonatal ICU/ITUs). Thus, the goal of the present study was to compare the frequency of both BF and exclusive breastfeeding (EBF) during admission to neonatal ICU/ITUs and during the first six months of life, before and after the implementation of the BFHI.

METHODS

The study was carried out in a neonatal unit of a teaching hospital in Londrina, Paraná State, southern Brazil, where the BFHI had been implemented.

Study population included all newborns admitted to the neonatal ICU/ITU in 1994 (N=285), the year preceding BFHI implementation in that hospital, and 1998 (N=368), when the hospital considered the "ten steps" process as completed. Newborns who died up to 48 hours after delivery (17 cases in 1994 and 18 cases in 1998) were excluded from the sample due to their extremely severe clinical conditions, which required parenteral feeding.

Data was collected from the medical records of ICU/ITU-admitted newborns. Information collected included the child's feeding patterns during admission

Table 1 - Characteristics of infants admitted to the neonatal Intensive Care Unit of a teaching hospital in Londrina, Brazil, 1994 and 1998.

Variables	1994 (N=268)*		1998 (N=350)*		P-value
	N	%	N	%	
Origin (maternal)					
Londrina	207	77.2	224	64.0	<0.01
Surroundings	61	22.8	126	36.0	
Sex					
Male	117	43.3	173	49.6	NS
Female	151	56.3	176	50.4	
Birthweight (grams)					
<1,500	51	19.0	59	16.9	<0.05
1,500 a 2,499	136	50.7	148	42.3	
2,500 ou mais	81	30.2	143	40.9	
Maturity classification (weeks)					
Preterm (<37)	173	66.8	217	63.5	NS
Term (37-42)	83	32.0	122	35.7	
Pos-term (>42)	3	1.2	3	0.9	
Weight/gestational age ratio					
Small for gestational age	62	23.1	49	14.0	<0.001
Adequate for gestational age	201	75.0	269	76.9	
Large for gestational age	5	1.9	32	9.1	
Duration of hospitalization (days)					
1 to 5	60	22.4	87	24.9	NS
6 to 10	70	26.1	96	27.4	
11 to 15	34	12.7	33	9.4	
16 to 20	24	9.0	23	6.6	
21 to 25	19	7.1	24	6.9	
26 to 30	15	5.6	11	3.1	
31 to 35	9	3.4	19	5.4	
36 or longer	37	13.8	57	16.3	
Apgar Index					
First minute					
0 to 3	52	19.8	38	11.4	<0.01
4 to 7	77	29.4	81	24.3	
8 to 10	133	50.8	215	64.4	
Fifth minute					
0 to 3	9	3.4	4	1.2	<0.01
4 to 7	41	15.6	31	9.3	
8 to 10	212	80.9	298	89.5	

*Deaths up to 48 hours excluded.
NS= Non significant.

and first six months of life, in addition to other variables of interest.

Information on the child's feeding during the first semester was obtained mainly through the follow-up provided by the hospital itself, in a specific outpatient facility for preterm babies, which keeps records of patients' visits in their medical files. The percentage of losses of feeding information during the first six months was similar in both groups, and corresponded to 33.4% of the children admitted in 1994 and 34.8% of the children admitted in 1998. Statistical analysis revealed no significant differences in the characteristics of the children for whom this information was missing between 1994 and 1998. The absence of such information was due mainly to failure to return for a follow-up appointment or to missing entries, in the child's medical files, with the type of feeding the child was receiving at the time of the appointment.

Data analysis was carried out through frequency comparison, using the Kaplan-Meier survival table and the Log-Rank test for estimating, respectively, the duration of breastfeeding and the differences between 1994 and 1998, in terms of both EBF and BF. EBF was defined as exclusive feeding with milk from the child's own mother or from a human milk bank (HMB). BF was defined as feeding with milk from the child's own mother or from a HMB, complemented with other foods.

Cox and logistic regression models were employed in order to control for the effects of variables which differed significantly between 1994 and 1998 and that might have had any potential influence on changes observed in these children's dietary patterns.

This project was analyzed and approved by the Research Ethics Committees of the Public Health School of the *Universidade de São Paulo* and of the *Universidade Estadual de Londrina*.

RESULTS

Table 1 shows the characteristics of newborns admitted to the neonatal ICU/ITU in 1994 and 1998. There was an increase in the frequency of newborns whose mothers did not live in Londrina (from 22.8% on 1994 to 36.0% in 1998), a diminution in the frequency of low-birthweight (from 69.7% to 59.2%) and of small-for-gestational-age babies (from 23.1% to 14.0%), and an improvement in Apgar index distribution. Distributions in terms of sex, gestational age, and duration of hospitalization were unaltered.

Table 2 describes the type of food given to newborns during hospitalization, where significant changes in the newborns' feeding patterns can be observed ($p<0.0001$). There was an expressive increase in the percentage of children who were exclusively breastfed (from 1.9% in 1994 to 41.7% in 1998). It was also noted that, despite the existence of an HMB in the hospital already in 1994, milk from this source was not used at this time. By 1998, the HMB was playing an active role in the maintenance of the exclusive breastfeeding of children admitted to the neonatal ICU/ITU, and the practice of exclusive formula feeding had been abolished.

As to the use of combined types of milk, in 1994, 80% of the children were given an association of maternal breast milk and formula; in 1998 such association virtually disappeared (0.6%), having been replaced mostly by a combination of maternal breast milk, milk from the HMB, and formula.

In the logistic regression analysis, feeding patterns during hospitalization were characterized as EBF or non-EBF, since there were no children fed exclusively with formula in 1998. In the final model, confounder control only slightly diminished the strong association between year of admission and EBF, with a crude odds ratio (OR) of 36.1 (95% CI 13.9-101.8) before,

Table 2 - Percentage distribution of newborns, according to type of feeding given during admission to neonatal Intensive Care Unit in a teaching hospital in Londrina, Brazil, 1994 and 1998.

Feeding pattern during hospitalization	1994 (N=257)*	1998 (N=345)*
Exclusive breast milk	1.9	41.7
Only maternal	1.9	9.6
Only milk bank	-	1.4
Maternal + milk bank	-	30.7
Exclusive formula	17.9	-
Breast milk + formula	80.2	58.3
Maternal + formula	80.2	0.6
Bank + formula	-	1.2
Maternal + bank + formula	-	56.5
Total 100.0	100.0	

p<0.0001
*Excluded deaths up to 48 hours and 11 cases (4.1%) in 1994 and five cases (1.4%) in 1998 due to missing information in medical records.

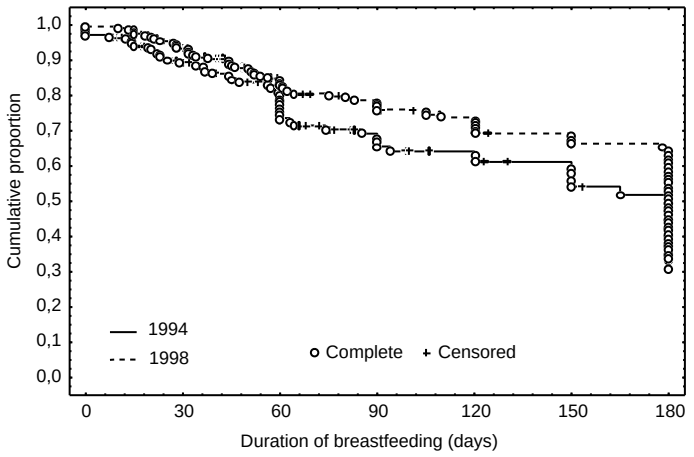

Figure 1 - Survival curves for breastfeeding during first six months of life. Infants admitted to the neonatal ICU/ITU of a teaching hospital in Londrina, Brazil, 1994 and 1998.

and an OR of 35.7 (95% CI 14.2-89.9) after confounder control.

The frequency of BF during the first six months of life for the 1994 and 1998 children was estimated using the Kaplan-Meier technique, distinguishing between two categories: BF and EBF. Figure 1 presents BF survival curves for the first six months. Median BF duration was 176 days in 1994 and 180 days in 1998. The Log-Rank test indicated no significant differences between the 1994 and 1998 survival curves.

Figure 2 presents EBF survival curves for the first six months. Median EBF duration was 12 days in 1994 and 45 days in 1998. The Log-Rank test indicated a significant difference ($p<0.001$) between the 1994 and 1998 EBF survival curves.

The children from 1994 and 1998 that were accompanied during the first six months of life differed significantly ($p<0.05$) with respect to two variables: weight/gestational age ratio and duration of hospitalization. In order to control for the influence of these differences on BF and EBF in the first six months, the Cox regression model was employed, the results of which confirmed the absence of statistically significant differences in the frequency of BF in the first six months in 1994 and 1998 (adjusted OR=1.07; 95% CI 0.82-1.40). The greater frequency of EBF in 1998 remained significantly higher in the final regression model even after confounder control (adjusted OR=3.77; 95% CI 1.15-12.35), which indicates that the odds of babies born in 1998 having been breastfed exclusively during the first six months of live are almost fourfold those of babies born in 1994.

DISCUSSION

Evaluations of the effectiveness of interventions already implemented by health services are frequent in Brazil.[8] If, on one hand, this is desirable, since there is a need for incorporating evaluation into the practice of healthcare services, on the other, it may generate methodological limitations for research. The present study was conducted after the implementation of the BFHI program, and included an analysis of records already present in the healthcare facility. From this perspective, the study's main limitation was the impossibility of establishing a comparable control group. The simultaneous observation, in a prospective study, of an intervention group and of a randomly selected control group – the design considered as most appropriate for evaluating this type of alteration – was unfeasible due not only to the survey having been conducted after the implementation of the BFHI in the hospital, but also to ethical issues, since there would have been one group which would benefit from breastfeeding and another which would not. The control group in the present study corresponded to the entire population of newborns admitted to the ICU/ITU in 1994, before the implementation of the BFHI. In order to compensate for the limitation posed by the lack of a randomly selected control group, we sought to identify eventual differences between the 1994 and 1998 groups and to control for these differences when comparing feeding patterns.

On the other hand, there are a few studies done in controlled populations that demonstrate the effectiveness of the BFHI on EBF. Luther et al[5] compared two groups of women from Santos, southeastern Bra-

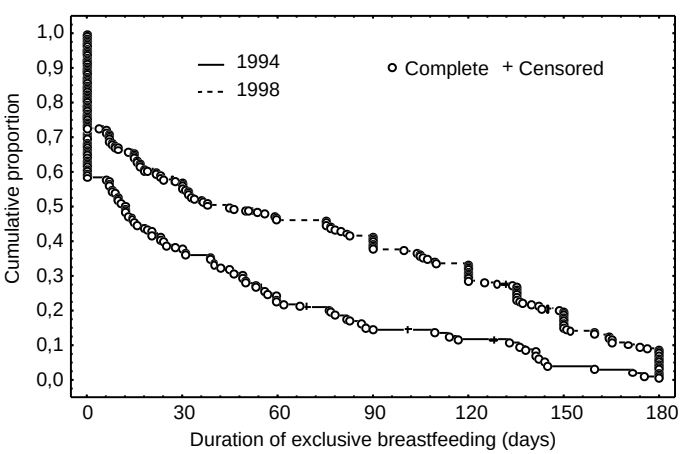

Figure 2 - Survival curves for exclusive breastfeeding during first six months of life. Infants admitted to the neonatal ICU/ITU of a teaching hospital in Londrina, Brazil, 1994 and 1998.

zil, one of which gave birth in a 'Baby-Friendly' hospital and another in a hospital without the program (control group). The results showed a 53-day increase in EBF duration among women who gave birth at the 'Baby-Friendly' hospital. Correa[2] analyzed the impact of healthcare measures on the duration of total breastfeeding in children born in two different hospitals, also in Santos, one of which had implemented the BFHI. The results showed that the implementation of the 'ten steps' contributed to the fulfillment of the need for protection, promotion, and motivation of breastfeeding in maternities.

According to Levin,[4] the BFHI would tend to benefit only healthy infants, since the 'ten steps' would have an effect only on maternity routine procedures, whereas a neonatal intensive therapy unit in the same hospital would not respond to all steps. However, the results of the present study are contrary to this author's opinion, since the implementation of BFHI's 'ten steps' in the neonatal ICU/ITU of the hospital studied resulted in increased rates of EBF (increasing median duration from 12 to 45 days between 1994 and 1998) and in the abolishment of the use of exclusive formula. Although it is not a strategy specifically designed for neonatal ICUs, in the hospital studied, the BFHI contributed towards the modification of feeding practices among children demanding special care, and towards an elongation of the duration of EBF in the first six months. This may be due to an increase in the healthcare team's motivation to change practices related to child feeding, and to the presence of a HMB in the same hospital. A similar survey conducted at the Boston Medical Center in the US, published in 2003, also demonstrated a positive impact of the BFHI on EBF and BF among children admitted to neonatal ICU/ITUs. [6]

It is now known that preterm babies are capable of responding appropriately when fed with human milk, and that the milk produced by the baby's own mother has a unique composition in terms of protein-energy contribution and immunological constituents. This milk is adjusted to the physiological peculiarities of the baby's metabolism, a fact which led the neonatal intensive care units of 'Baby-Friendly' hospitals to use exclusively human milk, with excellent results.[1] In this context, although not mandatory, it is recommended that institutions with neonatal ICUs also have access to a milk bank, preferably in the same premises, in order to provide for high-risk newborns admitted to the ICU. As has been demonstrated, the milk bank in the hospital studied played an essential part in the EBF of children admitted to the neonatal ICU/ITU.

Increases in median EBF duration become quite significant when dealing with preterm and low-birthweight newborns. A study conducted by Hylander et al,[3] in the Neonatal Intensive Care Unit of the University of Georgia's Medical Center, demonstrated a positive effect of breast milk on the incidence of infections among very-low-birthweight children during hospitalization. The incidence of infections was 29.3% among children who were given breast milk and 47.2% among those who received formula, and the incidence of sepsis and meningitis was 19.5% and 32.6% in these two groups, respectively. Infections were thus significantly reduced among children fed with breast milk.

The milk produced by the mothers of preterm babies is beneficial not only due to the higher levels of immunological factors, but also because of the lower risk of contamination. Preterm and low-birthweight babies do not always benefit from immunoglobulin transfer of through the placenta, which takes place after the 34th week of pregnancy. Due to the pathogenic environment to which they are exposed during admission to neonatal intensive care units, it is essential that newborns receive protection factors through breast milk, be it from their own mothers or, if this is not available, from a human milk bank, provided it is compatible with the baby's gestational age.

The decision of going through with all the steps of the BFHI, the change in the team's posture with respect to the feeding of these children, and the presence of a HMB in the hospital contributed towards the improvement of BF rates in a group of children for which breastfeeding was especially difficult, in light of the problems faced by infant, mother, family, and by the healthcare team that cares for the baby during delivery and hospitalization.

Increasing the rate of BF during ICU admission and outpatient follow up periods is also a means of ensuring the long-term benefits brought by this breastfeeding in terms of the immunological, emotional, nutritional, and neurological development of these children.

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