0021-7557/04/80-03/241
Jornal de Pediatria

Exclusive breastfeeding at the point of discharge of high-risk newborns at a Neonatal Intensive Care Unit and the factors associated with this practice

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Abstract

Objective: To study the rate of exclusive breastfeeding at the moment of hospital discharge of newborns admitted to a neonatal Intensive Care Unit and to analyze potential risk factors.

Methods: Four hundred and ninety-five medical records were studied, pertaining to neonates born between 1998 and 1999, admitted to a neonatal intensive care unit, before and after the implementation of the Baby Friendly Hospital Initiative policies. Babies born during the Baby Friendly Hospital Initiative transition period and outside the Maternity ward were excluded from the study, as were children or mothers who were transferred from the institution, abandoned children and also mothers unfit to breastfeed. Risk factors for non-exclusive breast-feeding at discharge were studied. Odds ratio and 95% confidence intervals were calculated using multivariate logistic regression.

Results: The exclusive breastfeeding rate increased from 36% at discharge (before the Baby Friendly Hospital Initiative) to 54.7% (after BFHI). The independent risk factors associated with non-exclusive breastfeeding were the use of enteral feeding (OR = 3.01), ante-natal consultations < 6 (OR = 2.75), relactation use (OR = 2.66), birth weight < 2,500 g (OR = 2.64) and being born during the period before Baby Friendly policies were implemented (OR = 2.75)

Conclusion: This research shows the potential efficiency of adopting Baby-Friendly policies to increase the chance of successful breastfeeding at the point of discharge for high-risk newborns.

J Pediatr (Rio J). 2004;80(3):241-8: Breast-feeding, newborn, high risk, Baby Friendly Hospital.

Introduction

The method by which the most adequate nutrition for infants' growth and development can be supplied is maternal breastfeeding. It also has an influence on the biological and emotional well-being of the mother-child dyad.[1]

Research has indicated beneficial aspects of breastfeeding, such as a positive association between the frequency of breastfeeding during the first 4 weeks of life and mental development of low weight and normal weight children.[2] Also indicated is better prognosis for the neurological development of breastfed premature children when compared with those fed milk-based formula.[3] Low birth weight babies who have no other symptomatic pathologies and who received breast milk had shorter hospital stays and less weight loss than those fed milk-

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Manuscript received Dec 19 2003, accepted for publication Mar 03 2004.

based formula.[4] Similarly, reduced risk for acute and chronic diseases[5-7] and increased survival rates are also observed when very low birth weight children are breastfed.[8]

Considering the above, premature and/or sick newborn babies require special attention to be paid to the encouragement and support of breastfeeding in addition to intensive care and treatment in order to assure them of better quality of life and of care from the moment of birth.

Because premature and sick children are separated from their mothers in order to receive the necessary and adequate treatment required to maintain their vital functions, which will delay or interrupt breastfeeding, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) state that there is a duty to teach mothers how to begin or maintain lactation if separated from their children.[1]

The results of a study into breastfeeding patterns in a poor population in the South of Brazil indicate that low weight was one of the main risk factors for weaning during the first 30 days of life.[9] Levin,[10] however, claims that breastfeeding is possible for low birth weight and sick babies and, furthermore, that it is even more important for their health.

Taking this group of factors into consideration, together with the decline in breastfeeding in many different countries worldwide, the WHO and UNICEF proposed the Baby Friendly Hospital Initiative (BFHI) aimed at encouraging health institutions and professionals to promote, protect and support breastfeeding as the best method of achieving adequate infant nutrition, in addition to allowing the family a well-informed and conscious choice on their children's nutrition. For an institution to receive the Baby Friendly Hospital accreditation it must adopt the tem steps to successful breastfeeding and pass periodic evaluations.

In this context, there is a perceived deficiency in knowledge about the impact that health services have on the breastfeeding of newborns. Further to this identified deficiency, it is understood that the current global valorization of the practice of breastfeeding, demonstrated by the WHO and UNICEF initiative, is a significant incentive to study this question.

The objective of the current study, therefore, was to evaluate the prevalence and pattern of breastfeeding among a group of newborn babies who had spent time in a high-risk ward at the at the point of hospital discharge and to analyze the potential factors that interfere with the practice of exclusive breastfeeding.

Methods

The target study population was completely composed of newborn babies admitted to the high-risk ward at the *Odete Valadares* maternity hospital (OV), during the period from May 1998 to May 2000. This institution was accredited as a Safe Maternity Unit, in 1998, as providing health and women's rights information, encouraging normal delivery and guaranteeing care during pregnancy, among other procedures. In May 1999, it was accredited as a Baby Friendly Hospital (BFH) by the Health Ministry.

Dyads admitted between December 1998 and October 1999 were excluded from the study as during this period training and modifications took place to adapt to and implement the 10 steps of the Baby Friendly Hospital Initiative. The objective of the study was, therefore, to study a population that had been exposed to the care laid out in the ten steps to successful breastfeeding and compare it with a population that had not been exposed. The reason that children born during the transition period were excluded was the fact that they were both influenced by the "old" standards and routines of the maternity unit and, at the same time, would have been affected by the training initiated during this period.

The high-risk ward's register of admissions, transfers, discharges and deaths was used to choose the study population. Eight hundred and thirty-nine registry entries were detected of which 344 were excluded for the following reasons: transferred to another institution (151), died (130), born at outside of the OV (21), discharged into judicial care (8), medical records not found on data-collection days (18), maternal problems (seven mothers with contraindications for breastfeeding and six transferred for clinical or surgical treatment), anencephaly (one), maternal rejection up until discharge (one) and no desire to breastfeed (one). The final study population was therefore a total of 495 children, 250 (50.5%) from the pre-BFH period and 245 (49.5%) from the post-BFH period.

IN choosing the variables to be analyzed factors were taken into account that could interfere with the practice of breastfeeding, selecting all data that was on the medical record and was possible to collect without compromising reliability. It is known that other factors not here gauged can interfere with the practice, but for the motive explained above, only data recorded on the medical record was used.

The dependent variable was type of breastfeeding at the point of discharge of the babies who had been admitted to the high-risk ward. In order to collect data on this variable the "dietary chart" was predominantly used. This instrument is completed daily on an obligatory basis and lists the newborn's diet and eliminations. This document is in constant use by the care team because of the importance of the quality and quantity of ingestion and evacuation to the evaluation of a newborn's condition. Three possible breastfeeding states at the point of discharge were defined: exclusive breastfeeding, when the dietary chart recorded feeding at the mother's breast and there was no record of supplementary feeding during the 3 days prior to hospital discharge; mixed breastfeeding, when feeding at the mother's breast was recorded, but there was also a record of supplementary feeding during the 3 days prior to discharge; and artificial feeding when there was no record of feeding at the mother's breast during the 3 days prior to discharge.

Other variables studied were: age, education and marital status of the mother, type of delivery, number of previous deliveries and number of prenatal consultations attended, sex do newborn, gestational age, birth weight, weight/gestational age ratio, 1 minute Apgar score, multiple births, diagnosis on admission, other diseases, period of admission (before or after BFHI), length of hospital stay, enteral feeding, age at start of suction using cup or bottle, age at start of suckling at maternal breast, the use of total parenteral nutrition (TPN) and the use of the relactation technique. This technique consists of the use of a probe and a 20 ml syringe with the piston removed. The probe is positioned with its final extremity next to the mother's nipple and the proximal extremity is coupled to the syringe which is filled with milk. The system is activated at while the baby sucks at the mother's breast. The objective of this technique is to both feed the baby and stimulate lactation for mothers with problems breastfeeding.

In order to analyze factors that could potentially interfere with the practice of breastfeeding, the type of feeding variable was collapsed into two states: exclusive breastfeeding or the absence of exclusive breastfeeding (including both mixed and artificial categories). This done, all of the variables potentially associated with the type of feeding variable were analyzed using the chi-square test. Adjustment for potential confounding variables (variables significantly associated with the dependent variable in the bivariate analysis) was performed using the multivariate logistic regression technique "step by step". The strength of associations was evaluated using the Relative Risk calculation (bivariate analysis) or Likelihood Ratio (multivariate analysis), with their respective 95% confidence intervals.

This research project was approved by the Ethics Committee at the *Universidade Federal de Minas Gerais* and authorized by the Teaching and Research Center at the *Odete Valadares* maternity hospital. Participants' anonymity was maintained for ethical reasons.

Results

The mean age of the mothers was 25.3±6.7 years. Education was split into four or less years' schooling, 49.3%, and from 5 to 12 years in school. Caesarian deliveries made up 52.9% of the total. A majority of births (64.9%) were the mothers' first or second pregnancies.

Early respiratory difficulties were the most common cause of the neonates being admitted (80.8%). The mean hospital stay was 23.4±19.5 days.

Nutrition while interned was as follows: 76.8% were fed enterally, by 10 days 67.7% of the babies were being fed with a cup or bottle and 57.9% had started suckling at the maternal breast, relactation was used in 8.7% and parenteral nutrition in 20.2% of cases.

Prevalence of absence of exclusive breastfeeding was significantly greater among mothers aged 35 years or more when compared with those between 20 and 34. There was no observed association with schooling, marital status or type of delivery. When maternal obstetric history is analyzed an elevated risk of not exclusively breastfeeding was observed among primiparous mothers when compared with multiparous mothers. The same was true of mothers who had attended less than six prenatal consultations (Table 1).

Table 2 demonstrates greater prevalence of absence of exclusive breastfeeding in the groups of children with low birth weight, gestational age less than 37 weeks, first minute Apgar score equal to or less than 7 points and multiple birth. There were no statistically significant associations with sex or weight/gestational age ratio.

The frequency of newborn babies discharged without achieving exclusive breastfeeding was greater in the groups that presented higher numbers of diseases (3 to 6); that stayed in hospital more than 30 days and that were born before the maternity unit was awarded the Baby Friendly Hospital title. The rate of exclusive breastfeeding before the BFHI was 36% and after the BFHI it was 54.7% (Table 3). The prevalence of each type of feeding at discharge, before and after the Baby Friendly Hospital Initiative, is shown in Figures 1 and 2, respectively.

With respect of the variables that characterize the babies' nutrition during their hospital stays, groups of children that were fed enterally, that began feeding by cup or bottle and suckled at the maternal breast after 10 days, that used relactation and that used parenteral nutrition presented greater prevalence of exclusive breastfeeding absence at the point of hospital discharge (Table 3).

Table 4 contains the final multivariate model obtained by logistic regression for associated with not breastfeeding exclusively on the occasion of hospital discharge. Observe that groups of babies that were fed enterally, whose birth weights were less than 2,500 g and who had been born before the maternity unit was awarded the title of Baby Friendly Hospital presented significantly greater risk of not breastfeeding exclusively at discharge.

Discussion

The results of this study show that a number of different factors were associated with the practice of exclusive breastfeeding at discharge of high-risk newborn babies. Of the different categories of newborn babies that exhibited rates of exclusive breastfeeding of more than 50%, the following stand out: mothers who attended six or more prenatal consultations, birth weight above 2,500 grams, gestational age more than 37 weeks, two or less diseases diagnosed during hospital stay, born post-BFHI and early (before 10 days) suckling at the breast. These findings show that biological factors, maternal factors and breastfeeding promotion orientated health care providers, can be important to the success of breastfeeding in newborn babies whose survival is at risk.

Table 1 - Demographic variables, maternal obstetric history and the association with the type of feeding at discharge (Maternidade Odete Valadares, Belo Horizonte, MG, Brazil, 1998-2000)

Variable	Exclusive breastfeeding				p	RR*	95% CI†
	No		Yes				
	n	%	n	%			
Mother's age							
13-19	59	53.6	51	46.4	0.97	1.01	0.83-1.23
20-34	176	53.2	155	46.8		1.0	
35 or older	36	66.7	18	33.3	0.08	1.25	1.01-1.55
Schooling							
0-4 years	102	58.0	74	42.0		1.0	
5-12 years	98	54.1	83	45.9	0.54	0.93	0.78-1.12
Marital status							
Married/stable relationship	180	53.6	156	46.4		1.0	
Single	51	62.2	31	37.8	0.20	1.16	0.95-1.41
Type of delivery							
Vaginal	125	53.6	108	46.4		1.0	
Cesarean	146	55.7	116	44.3	0.70	1.04	0.88-1.22
n. of previous pregnancies							
Non-primiparous	148	50.9	143	49.1		1.0	
Primiparous	120	59.7	81	40.3	0.06	1.17	1.00-1.38
n. of prenatal visits							
Six or more	55	39.3	85	60.7		1.0	
Up to five	188	60.8	121	39.2	0.00	1.55	1.24-1.94

* RR = relative risk. † CI = confidence interval. Reference category = 1.0.
Unavailable information per variable: schooling (138); marital status (77); n. of previous pregnancies (3); n. of prenatal visits (46).

Table 2 - Variables related to the newborn and the association with the type of feeding at discharge (Maternidade Odete Valadares, Belo Horizonte, MG, Brazil, 1998-2000)

Variable	Exclusive breastfeeding				p	RR*	95% CI†
	No		Yes				
	n	%	n	%			
Sex							
Male	134	52.3	122	47.7		1.0	
Female	137	57.3	102	42.7	0.30	1.10	0.93-1.29
Birth weight							
≥ 2,500 g	35	31.5	76	68.5		1.0	
< 2,500 g	236	61.5	148	38.5	0.00	1.95	1.47-2.59
Gestational age							
≥ 37 weeks	37	33.3	74	66.7		1.0	
< 37 weeks	233	60.8	150	39.2	0.00	1.83	1.39-2.40
Ratio weight/GA‡							
AGA/BGA§	230	53.5	200	46.5		1.0	
SGA§	41	63.1	24	36.9	0.18	1.18	0.96-1.45
1st minute Apgar							
> 7	117	50.0	117	50.0		1.0	
0-7	149	60.6	97	39.4	0.02	1.21	1.03-1.43
Multiple birth							
No	223	51.9	207	48.1		1.0	
Yes	48	73.8	17	26.2	0.00	1.42	1.20-1.69

* RR = relative risk. † CI = confidence interval. ‡ GA = gestational age.
§ AGA = appropriate for gestational age; BGA = big for gestational age; SGA = small for gestational age.
Reference category = 1.0. Unavailable information per variable: gestational age (1); 1st minute Apgar (15).

Table 3 - Variables related to hospital stay and feeding of newborns during hospital stay associated with the type of feeding at discharge (Maternidade Odete Valadares, Belo Horizonte, MG, Brazil, 1998-2000)

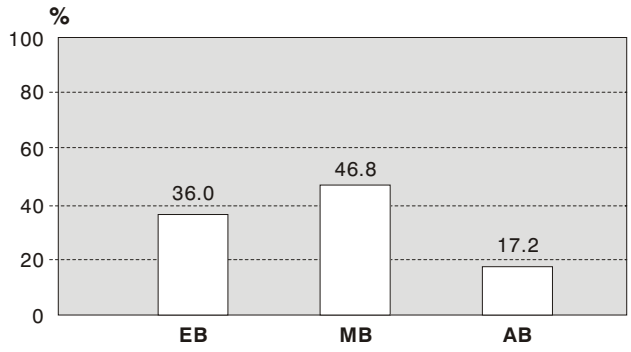
Variable	Exclusive breastfeeding				p	RR*	95% CI†
	No		Yes				
	n	%	n	%			
n. of diseases							
0-2	159	46.6	182	53.4		1.0	
3-6	112	72.7	42	27.3	0.00	1.56	1.34-1.81
Length of hospital stay							
≤ 30 days	156	45.3	188	54.7		1.0	
> 30 days	115	76.2	36	23.8	0.00	1.68	1.45-1.94
Period of admission							
After BFHI‡	111	45.3	134	54.7		1.0	
Before BFHI‡	160	64.0	90	36.0	0.00	1.41	1.20-1.67
Enteral feeding							
No	39	33.9	76	66.1		1.0	
Yes	232	61.1	148	38.9	0.00	1.80	1.38-2.35
Age at the beginning of the use of cup or feeding bottle							
≤ 10 days	141	45.0	172	55.0		1.0	
> 10 days	109	72.7	41	27.3	0.00	1.61	1.38-1.89
Age at the beginning of breastfeeding							
≤ 10 days	86	35.0	160	65.0		1.0	
> 10 days	124	69.3	55	30.7	0.00	1.98	1.63-2.41
Relactation							
No	238	52.7	214	47.3		1.0	
Yes	33	76.7	10	23.3	0.00	1.46	1.21-1.76
Parenteral nutrition							
No	195	49.4	200	50.6		1.0	
Yes	76	76.0	24	24.0	0.00	1.54	1.33-1.79

* RR = relative risk. † CI = confidence interval. ‡ BFHI = Baby Friendly Hospital Initiative.
Reference category = 1.0. Unavailable information per variable: age at the beginning of the use of cup or feeding bottle (32); age at the beginning breastfeeding (70).

Table 4 - Final model of association with not breastfeeding exclusively on the occasion of hospital discharge

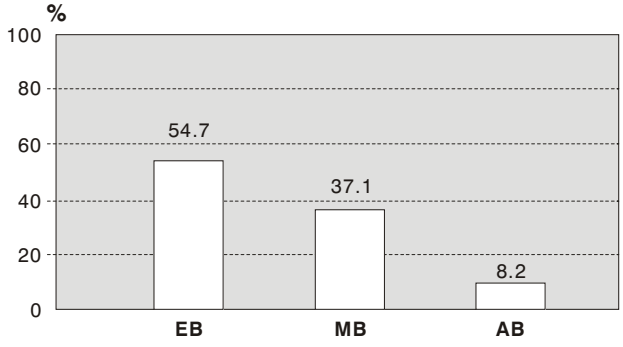
Independent variables	OR*	95% CI†	p
Enteral feeding	3.01	1.77-5.12	0.000
n. of prenatal visits < 6	2.21	1.42-3.44	0.000
Relactation technique	2.66	1.13-6.29	0.026
Admission before BFHI‡	2.75	1.80-4.20	0.000
Birth weight < 2,500 g	2.64	1.55-4.50	0.000

* OR = Odds ratio.
† CI = Confidence interval.
‡ BFHI = Baby Friendly Hospital Initiative.



EB = exclusive breastfeeding; MB = mixed breastfeeding;
AB = artificial breastfeeding.

Figure 1 - Prevalence of each type of feeding at discharge before the Baby Friendly Hospital Initiative



EB = exclusive breastfeeding; MB = mixed breastfeeding;
AB = artificial breastfeeding.

Figure 2 - Prevalence of each type of feeding at discharge after Baby Friendly Hospital Initiative

The increase in high-risk neonate exclusive breastfeeding prevalence at hospital discharge with the implementation of the BFHI is comparable with the results of research performed in Boston by Merewood et al.[11] on children admitted to a neonatal intensive care unit. The proportion of children exclusively receiving their mothers' milk at two weeks went from 9.3% (1995) to 39% (1999) after the BFHI was implemented.

In the current study there was no significant association related to the level of maternal schooling, in contrast with the results of another study which indicated that a greater prevalence of breastfeeding at hospital discharge was found among very low birth weight neonates whose mother's had a higher degree of education.[12]

Enteral feeding and relactation showed themselves to be practices with a negative influence on exclusive breastfeeding. Relactation is used when mothers and/or children are having problems initiating and/or establishing breastfeeding during the first few days of life. Therefore, children subjected to this practice are those that exhibit the greatest level of difficulty in establishing exclusive breastfeeding. This being the case, the practice of relactation is, in fact, a marker of difficulties threatening the success of breastfeeding.

In relation to the number of prenatal consultations attended by the mothers this study found a significant association between a reduced number of prenatal consultations (less than six), and absence of exclusive maternal breastfeeding on the occasion of hospital discharge, which is similar to findings from research with healthy newborn babies.[13,14] During the prenatal period the expectant mother should be sensitized and correctly informed about lactation management and the advantages of exclusive breastfeeding until 6 months of age. It is during this period that factors that may make breastfeeding difficult should be detected so that they may be dealt with opportunely.

Based on the data from the current study it is not possible to extrapolate the behavior of breastfeeding rates post-discharge. However, in a study performed in a number of different municipalities of the State of São Paulo found that children who were not born in BFH had 49% and 34% more chances of interrupting breastfeeding by 4 months and 12 months of age, respectively, than did those who were born in BFH.[15] In an experimental study performed with preterm newborn babies (32 to 36 weeks), at the university hospital of the Ribeirão Preto medical school, *Universidade de São Paulo*, no significant differences were found in the prevalence of breastfeeding at discharge and at three months of age, between children fed from a cup or a bottle. Nevertheless, when the authors compared breastfeeding rates at three months among those who were being breastfed during the first control visit, a greater prevalence was found among those who had been fed by cup (68.4%) than among those who had been bottle fed (33.3%). The authors also pointed out another possible benefit of cups: a lower incidence of saturation dropping (13.6% cup and 35.3% bottle). At the OV, during the period that routines were being adapted to the "Ten steps to successful maternal breastfeeding", the bottle was also substituted with the cup.[16]

One difficulty with performing this and other studies, in which data is obtained form medical records, is related to the lack of notes made by the care team. In contrast, in terms of information about the babies' nutrition while in the ward, the dietary chart used at the institution where the study was performed was an important aid to data collection. The study by Merewood et al.[11] also used a similar chart which reinforces the importance of complete and legible records and of recognizing their importance for future research.

Armed with the results of the Boston[11] and Ribeirão Preto[16] studies it appears reasonable to us to attribute, at least in part, the significant changes that have occurred since the period when the OV was awarded the BFH title, an impressive increase in exclusive breastfeeding success rates during the period between October 1999 and May 2000.

The results of the current study allow us to conclude that a variety of factors related to health service practices (number of prenatal consultations, BFHI), hospital practices (enteral feeding, relactation) and biological factors (low weight) are potential independent factors making the success of exclusive breastfeeding more difficult among newborn children admitted to the high-risk ward of the *Odete Valadares* maternity hospital. In the face of all this, and with a 2.75 times increased risk of leaving without exclusive breastfeeding if born before the introduction of the Baby Friendly Hospital Initiative policies, investment by health services and the government to ensure that hospitals that care for women and children adopt the BFHI standards is justifiable.

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