

Exclusive breastfeeding and factors related to early weaning: a comparative study between 1999 and 2008

Aleitamento materno exclusivo e fatores associados a sua interrupção precoce: estudo comparativo entre 1999 e 2008
Lactancia materna exclusiva y factores asociados a su interrupción temprana: estudio comparativo entre 1999 y 2008

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ABSTRACT

Objective: To analyze the indicators of exclusive breastfeeding (EB) in Brasilia's University Hospital (BUH) during a 10-year interval and to verify associated factors to early weaning.

Methods: A retrospective cross-sectional study was conducted by chart review of children attending the Pediatric Clinic during 1999 and 2008. The duration of exclusive breastfeeding was categorized at four months and four months or more. Prevalence ratios for early weaning (EB <4 months) were estimated with a model of Poisson regression and robust variance. Non-parametric Mann-Whitney test was used to compare the exclusive breastfeeding duration in the studied years.

Results: Among 2,173 patients, 1,443 in 1999 and 730 in 2008. There was an increase from 110.7 to 123.6 days in the duration of EB. A significant association between maternal education and early weaning was shown, with a 12.6% higher prevalence in mothers with less than eight years of schooling compared to those with 11 or more years. No other associations were found in the study.

Conclusions: Similarly to what was found in Brazilian capitals and Brasilia, there was an increase in the length of exclusive breastfeeding related to mother educational level. Nevertheless, the duration exclusive breastfeeding is still below the threshold of 180 days recommended by the World Health Organization.

Key-words: breast feeding; weaning; risk factors.

RESUMO

Objetivo: Analisar os indicadores do aleitamento materno exclusivo (AME) do Hospital Universitário de Brasília (HUB) nos anos de 1999 e 2008 e identificar fatores associados a sua interrupção precoce

Métodos: Estudo retrospectivo transversal com análise de prontuários de crianças atendidas nos anos 1999 e 2008 no Ambulatório de Pediatria, Crescimento e Desenvolvimento do HUB. A duração do AME foi dicotomizada em até quatro meses e quatro meses ou mais, estimando as razões de prevalência para o desmame precoce (AME <4 meses), utilizando-se um modelo de regressão de Poisson com variância robusta e o teste não paramétrico de Mann-Whitney para comparação do tempo de AME nos anos estudados.

Resultados: Foi analisado um total de 2.173 pacientes, 1.443 referentes ao ano de 1999 e 730 referentes ao ano de 2008. Observou-se um incremento de 110,7 para 123,6 dias na duração do AME de 2008 em relação a 1999 ($p < 0,0001$). O desmame precoce foi 12,6% maior em mães com até sete anos de estudo do que em mães com 11 ou mais anos de estudo ($p < 0,05$). Os demais fatores analisados não mostraram relação estatística com o desmame precoce.

Conclusões: Assim como o encontrado nas capitais brasileiras e Distrito Federal, verificou-se incremento no que diz respeito à duração do AME, associado positivamente ao nível educacional materno mais elevado. Convém ressaltar, porém, que a duração observada no estudo ainda se encontra abaixo dos 180 dias recomendados pela Organização Mundial de Saúde.

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Palavras-chave: aleitamento materno; desmame; fatores de risco.

RESUMEN

Objetivo: Analizar los indicadores de lactancia materna exclusiva (LME) del Hospital Universitario de Brasília (HUB) los años de 1999 y 2008 e identificar factores asociados a su interrupción temprana.

Métodos: Estudio retrospectivo transversal con análisis de prontuarios de niños atendidos en los años de 1999 y 2008 en el Ambulatorio de Pediatría, Crecimiento y Desarrollo del HUB. La duración del LME fue dicotomizada en hasta cuatro meses y cuatro meses o más, estimando las razones de prevalencia para el desmame precoz (LME < 4 meses), utilizando un modelo de regresión de Poisson con variancia robusta y la prueba no paramétrica de Mann-Whitney para comparación del tiempo de LME en los años estudiados.

Resultados: Se analizó un total de 2.173 pacientes, siendo 1.443 referentes al año de 1999 y 730 al año de 2008. Se observó un incremento del 110,7 para 123,6 días en la duración del LME de 2008 respecto a 1999 ($p < 0,0001$). El desmame temprano fue el 12,6% superior en madres con hasta siete años de estudio que en madres con 11 o más años de estudio ($p < 0,05$). Los demás factores analizados no mostraron relación estadísticamente significativa con desmame temprano.

Conclusiones: Así como encontrado en las capitales brasileñas y Distrito Federal, se verificó incremento en lo que se refiere a la duración del LME, asociado positivamente al nivel educacional materno más elevado. Conviene subrayar, sin embargo, que la duración observada en el estudio todavía es inferior a los 180 días recomendados por la Organización Mundial de Salud.

Palabras clave: lactancia materna; destete; factores de riesgo.

Introduction

Breast-feeding is essential to children's health and development during their first months of life^(1,2). In addition to the benefits of the calorie and protein supplied, breastmilk also provides immunological protection that is particularly necessary during the first year of life⁽³⁾. The literature reports that exclusively breast-fed newborn infants have a reduced risk of death from diarrhea and respiratory diseases⁽⁴⁾, enjoy benefits in the areas of cognition⁽⁵⁾ and motor function and also score higher on indicators of general infant health⁽⁶⁾.

Since 2001, the United Nations Children's Fund (Unicef) and the World Health Organization (WHO) have been recommending exclusive breastfeeding (EBF) until 6 months of age and maintenance of breastfeeding combined with complementary feeding (mixed breastfeeding - MB) from 6 to 24 months or older⁽⁷⁾.

A series of Brazilian studies⁽⁸⁾ covering the country's state capitals and the Distrito Federal (DF) reported increases in breastfeeding indicators from 1999 to 2008, with median EBF duration rising from 23.4 to 54.1 days and median duration of breastfeeding from 295.9 to 341.6 days. It was also notable that mean EBF prevalence among children less than 4 months rose from 35.5% in 1999 to 51.2% in 2008, with a variation of 15.7% for Brazil as a whole and 10% in the DF taken alone. Notwithstanding, it was found that despite the fact that breastfeeding rates have improved significantly in the Brazilian state capitals and the DF, they are still well below the targets set by the WHO, which is to a great extent the result of the heterogeneous nature of breastfeeding practices in the different regions and the federal capital.

National health policies, such as the National Breastfeeding Policy (1981) and the Baby Friendly Hospital Initiative (1990), or even local policies, such as the lactation counseling provided at the Breastfeeding Encouragement Center and Milk Bank at the Hospital Universitário de Brasília, are designed to achieve the objective of having a positive impact on the quality and duration of breastfeeding for all children, with special emphasis on those at risk of premature weaning.

The objective of this study was to analyze the behavior of indicators of exclusive breastfeeding and its prevalence in data for 1999 and 2008 from the Hospital Universitário de Brasília (HUB), which is a public tertiary hospital, and to test for significant associations between demographic and clinical factors and early cessation.

Methods

This was a retrospective cross-sectional study analyzing medical records for children seen in 1999 and 2008 at the HUB's pediatric growth and development clinic. There were 1,996 separate consultations in 1999 and 920 in 2008. Medical records were selected from these datasets if they met the following inclusion criteria: a) age of patient from 0 to 1 year on day of consultation; b) No contraindications or other factors preventing breastfeeding, such as severely malformed infants or seropositive mothers; c) Medical record available in the hospital archives and no missing or incomplete information that could introduce doubt about any of the study variables. On this basis, 95 medical records from 1999 and 13 from 2008 were excluded for not meeting the age criterion, 10 from 1999 and 15 from

2008 because there were contraindications to breastfeeding; and, finally, 448 from 1999 and 162 from 2008 were excluded either because the records were missing from the archives or because they were missing information.

All of the remaining medical records that met the inclusion criteria described above were then analyzed for the following variables: year of consultation (1999 or 2008); location of town of origin (a) Plano Piloto, Lago Sul or Lago Norte, b) other administrative regions, c) the state of Goiás, d) other locations); age of mother (<20, 20–24, 25–29, 30–34 or ≥35 years); mother's educational level (<7, 8–10 or ≥11 years in education); number of prenatal consultations (0, 1–4, 5–9, ≥10 consultations); number of previous pregnancies (0, 1–3, 4–6, >6 pregnancies); type of delivery (normal or cesarean); sex of infant; gestational age – prematurity (25 to 37 weeks), full term (38 to 42 weeks), overdue (over 42 weeks); and type of infant feeding.

Data on feeding were collected from the medical records and classified according to WHO criteria⁽⁹⁾ as EBF, MB or artificial feeding (AF). Children were classified as on EBF when fed only breastmilk with no other liquids whatsoever, such as water, teas and juices, or other foods with the exception of medications; they were defined as on MB if fed breastmilk and other solid, semisolid

or liquid foods, including non-human milks; and were defined as on AF if they were not being fed any breastmilk.

A statistical analysis was conducted using SAS 9.2 in order to compare breastfeeding estimates for the two years and to test for possible associations between maternal and infant factors and EBF duration. Exclusive breastfeeding duration for 1999 and 2008 was compared using the Mann-Whitney nonparametric test. The effects on exclusive breastfeeding of infant's sex and gestational age, mother's age and educational level, type of delivery, number of prenatal consultations and number of previous pregnancies were investigated using a Poisson regression model with robust variance⁽¹⁰⁾.

Data collection for this study was initiated after the project had been approved by the Research Ethics Committee at the Faculty of Health.

Results

All of the medical records that met the inclusion criteria were analyzed, making a total of 2,173 medical records: 1,443 from 1999 and 730 from 2008. Table 1 shows the distribution of the children according to the variables investigated.

Table 1 - Distribution of variables studied for 1999 and 2008, Hospital Universitário de Brasília

	Condition	1999		2008	
		n	%	n	%
Origin	Plano Piloto, Lago Sul and Lago Norte	177	12.7	54	7.4
	Other administrative regions	978	68.5	493	69.0
	Goiás	247	17.7	165	22.6
	Other	16	1.1	7	1.0
Mother's age (years)	<20	229	19.4	82	13.7
	20–24	404	33.8	152	25.4
	25–29	294	24.5	169	28.5
	30–34	190	16.0	110	18.1
	≥35	78	6.3	191	14.3
Maternal educational level (years)	≤7	462	39.7	107	18.7
	8–10	406	35.1	155	27.1
	≥11	296	25.2	311	54.2
Number of prenatal consultations	0	19	1.7	8	1.4
	1–4	362	31.4	86	14.7
	5–9	887	61.8	410	70.4
	≥10	60	5.1	82	13.5
Number of previous pregnancies	0	457	38.8	258	40.9
	1–3	629	53.0	324	52.2
	4–6	85	7.1	35	5.6
	>6	26	1.1	8	1.3
Type of delivery	Normal	783	65.0	374	57.8
	Cesarean	422	35.0	284	42.2
Sex of infant	Female	693	49.0	339	46.6
	Male	722	51.0	392	53.4
Gestational age	Prematurity	178	15.0	101	14.6
	Full term	995	83.8	540	83.2
	Overdue	14	1.2	14	2.2
Mean EBF duration (days)		110.7		123.6	

EBF: exclusive breastfeeding

The Mann-Whitney nonparametric test was used to compare EBF duration for the two years and showed that duration was statistically greater in 2008 than in 1999 ($p < 0.0001$), having increased from 110.7 days to 123.6 days.

Exclusive breastfeeding duration was dichotomized as less than 4 months or 4 months or more. Table 2 shows the distribution of the variables by exclusive breastfeeding duration and Table 3 shows prevalence ratios for early weaning according to the same factors, calculated using multivariate Poisson regression. There was a statistically significant relationship ($p < 0.05$)

between year of consultation and prevalence of early weaning, which was 23.6% higher in 1999 than in 2008. Maternal educational level was also associated with prevalence of early weaning, since this was 12.6 % higher among mothers with less than 7 years' study than among those who had spent 11 years or more in education.

In this study the factors infant's sex, mother's age, gestational age, type of delivery, number of prenatal consultations and number of previous pregnancies had no statistical relationship with early weaning.

Table 2 - Distribution of socioeconomic factors by exclusive breastfeeding duration, Hospital Universitário de Brasília

	EBF duration in 1999				EBF duration in 2008			
	<4 months		≥4 months		<4 months		≥4 months	
	n	%	n	%	n	%	n	%
Age of mother								
<20	61	21.3	77	20.0	17	13.0	26	9.6
20-24	93	31.1	127	33.0	35	27.8	67	24.8
25-29	74	24.5	94	24.4	38	31.4	79	29.3
30-34	45	15.4	60	15.6	23	16.5	56	20.7
≥35 years	25	7.7	27	7.0	20	11.3	42	15.6
Maternal education (years)								
<7	109	36.9	137	39.3	24	19.1	43	16.6
8-10	174	39.4	230	31.7	34	27.3	73	28.2
≥11	11	23.8	9	29.0	68	53.6	143	55.2
Number of prenatal consultations								
0	5	1.8	2	0.5	0	0	3	1.1
1-4	76	25.5	109	29.2	14	14.7	41	15.3
5-9	189	66.2	239	64.6	90	74.3	188	70.2
≥10	20	6.5	20	5.4	21	11.0	36	13.4
Number of previous pregnancies								
0	135	46.7	157	41.1	64	44.0	100	35.7
1-3	137	45.6	199	52.1	73	53.6	156	55.7
4-6	21	6.7	22	5.8	3	1.6	20	7.2
>6	4	1.1	4	1.0	1	0.8	4	1.4
Type of delivery								
Normal	185	61.5	263	67.3	74	56.5	174	58.4
Cesarean	115	38.5	128	32.7	68	43.5	124	41.6
Sex of infant								
Male	192	53.8	224	49.5	84	52.2	173	53.4
Female	165	46.2	230	50.5	73	47.8	151	46.6
Gestational age								
Prematurity	50	16.4	54	14.1	25	16.9	42	14.2
Full term	248	82.4	323	84.3	114	81.2	247	83.8
Overdue	3	1.2	6	1.6	3	1.9	6	2.0
Total	363	44.1	459	55.8	159	32.7	327	67.28

EBF: exclusive breastfeeding

Table 3 - Multivariate Poisson Regression of factors associated with exclusive breastfeeding duration greater than or equal to 4 months, Hospital Universitário de Brasília

	PR	95%CI	p-value
Sex of infant			
Female vs. Male	0.98	0.91–1.05	0.63
Type of delivery			
Cesarean vs. Normal	1.06	0.98–1.15	0.12
Number of previous pregnancies			
None vs. one or more	1.02	0.93–1.11	0.63
Prenatal consultations			
≤6 vs. >6 consultations	1.01	0.94–1.10	0.66
Age of mother			
<20 vs. ≥20	0.99	0.98–1.00	0.31
Mother's educational level			
<7 vs. ≥ 11 years of study	1.12	1.01–1.24	0.01
8–10 vs. ≥ 11 years of study	1.08	0.98–1.20	0.10
Prematurity			
Premature vs. full term + overdue	1.00	0.89–1.11	0.97
Study year			
1999 vs. 2008	1.23	1.12–1.35	<0.0001

RP: Prevalence ratio; 95%CI: 95% confidence interval

Discussion

This retrospective study aimed to investigate temporal trends in breastfeeding at the HUB from 1999 to 2008. However, since this is not a multicenter study, its external validity is open to question. Additionally, the fact that the patients were seen at the hospital in their first, second, fourth, sixth, eighth, tenth and twelfth months of life means that behaviors that were adopted during intervals between consultations could be subject to memory bias on the part of the people taking the children to the consultations.

The optimum duration of EBF is a topic that has been debated a great deal and the advantages of 6 months' duration with relation to 4 months still merit increased precision and applicability⁽⁷⁾. In this study a 4-month cut-off was used as an indicator of premature cessation since before 2001 the WHO recommended 4 to 6 months, so this was the parameter that was available for comparison of premature cessation during both years studied (1999 and 2008). Factors possibly associated with EBF duration were also analyzed, in addition to absolute duration.

The data collected show that the maternal age profiles for the two years were similar to what has been reported by other studies, with a majority of the mothers aged 20 to 29 years⁽¹¹⁾. Despite this, there was a significant change in age profile from 1999 to 2008: the percentage of mothers aged

less than 24 reduced and the proportion of mothers aged over 25 increased, demonstrating a trend for mothers' ages to increase, which has previously been reported not only in the DF, but also in the state capitals⁽⁸⁾.

Several studies have shown that maternal age was an important factor in premature weaning, including Bueno *et al*⁽¹²⁾ and Espírito Santo⁽¹³⁾, who suggested that mothers younger than 25 tend to introduce complementary foods earlier in their babies' lives. Nevertheless, this study found that maternal age was not a risk factor for premature cessation, since there was no significant difference between mothers under 20 years and the rest of the sample. This result, which is in line with the results of a study conducted in the state of Minas Gerais⁽¹⁴⁾ with the same age group, indicates that this variable is dependent on others, such as the number of previous pregnancies⁽¹⁵⁾, or on protective factors that are independent of mother's age, such as rooming-in or breastfeeding guidance⁽¹⁴⁾.

The interval between 1999 and 2008 saw an impressive increase in maternal educational level, since in the earlier year just one quarter of mothers had studied for 11 years or more, whereas by 2008 more than half of the mothers had studied for 11 years or more. The authors of studies conducted in Brazil, such as Brunken *et al*⁽¹⁶⁾, working in Porto Alegre, and several authors^(17,18) from São Paulo, have consistently suggested that low maternal educational level is associated with early weaning and have pointed out that increases in maternal educational level promote breastfeeding and delay premature introduction of complementary foods. However, there are studies, such as those conducted by Caldeira and Goulart⁽¹⁹⁾ and by Caetano *et al*⁽²⁰⁾, that failed to detect this association.

Another variable that the literature indicates has a positive association with breastfeeding is number of prenatal consultations. However, in contrast with what was expected, the results of this study did not reveal any influence on EBF duration, although there was a significant increase in the number of mothers who attended more than 10 consultations and a reduction in the number who attended less than five prenatal consultations. There are reports in the literature that demonstrate that during the prenatal period healthcare professionals can have a positive impact on EBF duration, through providing mothers with guidance and motivation^(21,22). It is therefore open to speculation whether the scant attention that schools of medicine pay to breastfeeding⁽²³⁾ and the resulting lack of proper training in this area for professionals could result in poor quality consultations, which in turn fail

to have an impact, leading to the absence of a significant relationship between the number of times mothers met health professionals and breastfeeding duration.

In this study maternal parity was associated with EBF duration, in contrast with what several other authors have observed. However, Venâncio *et al*⁽¹⁸⁾ also reported that early weaning was more common among primiparous women. Meyerink and Marquis⁽²⁴⁾ suggested that that greater the number of pregnancies, the greater the mother's experience and, consequently, the longer the duration of breastfeeding for successive children. Since a significant proportion of the population studied here was primiparous, further studies should be conducted in order to elucidate this association, thereby helping to delineate a population at greater risk of early weaning and indicating subsets in which increased intervention is necessary to avert this outcome.

The results for type of delivery (cesarean or normal) agreed with studies undertaken in other Brazilian maternity units, since they did not indicate any relationship between type of delivery and duration of exclusive breastfeeding⁽²⁵⁻²⁷⁾, even when the mother's post-operative status was taken into account.

The infant's sex did not have a relationship with breastfeeding duration, in contrast with results published by Pérez-Escamilla *et al*⁽²⁸⁾ and by Tabai *et al*⁽²⁹⁾, although the explanations that those authors found for their findings were related to cultural issues, which is an aspect that was not investigated in the present study.

Duration of pregnancy was not a significant factor in breastfeeding promotion ($p=0.978$), in line with studies conducted by Silveira *et al*⁽³⁰⁾ and Rocha and Leal⁽³¹⁾. Nevertheless, it is known that even though breastfeeding is recommended for preterms, it is often delayed because neurological system immaturity and muscle hypotonia interfere with suckling, deglutition and respiration reflexes and, according to Padovani⁽³²⁾, the mothers of very low weight preterms suffer from more doubts and worries about breastfeeding than the mothers of babies carried to full term. Similarly, overdue babies that need intensive care also have breastfeeding delayed, which is a barrier to breastfeeding⁽³³⁾. Rocha and Leal⁽³¹⁾ suggest that increased breastfeeding duration is more closely related to mothers breastfeeding correctly and believing in the efficacy of doing so than to the duration of pregnancy in itself.

The II Survey of Breastfeeding Prevalence in Brazilian State Capitals and the Distrito Federal⁽⁸⁾, conducted by the

Brazilian Ministry of Health, found that median EBF duration increased by a month, from 23.4 days (22.1–24.7) in 1999 to 54.1 days (50.3–57.7) in 2008. The results of this study relating to the EBF trend showed a significant increase in duration, rising from 110.7 days in 1999 to 123.6 days in 2008. Although this increase (12.9 days) was smaller than that observed by the Ministry of Health's survey⁽⁸⁾, in both years absolute EBF duration in days was greater in this study.

The Ministry of Health⁽⁸⁾ survey recorded an increase from 35.5% prevalence of EBF among children under 4 months old in 1999 to 51.2% in 2008, for the set of all Brazilian capitals plus the DF; while the rates were 50.6 and 60.6%, respectively, for the DF alone. In this study, 56.9% of children were exclusively breastfed for 4 months or more in 1999 and in 2008 the rate had risen to 70.8%. These data show that the results observed for the population seen at the HUB reinforce the Ministry of Health's findings with relation to EBF for 4 months or more. One possible hypothesis for the difference between the HUB rate and the indicators for the state capitals and the DF is that it is the result of a combination of the awareness-raising work carried out at the Breastfeeding Encouragement Center and Milk Bank at the HUB, the pediatric care provided at the hospital during the children's first year of life and the increased educational level of the mothers. These factors are capable of increasing mothers' adherence to EBF and the effect of each of these factors should be analyzed in future studies. Provision of these types of services has been shown to be a decisive factor in the decision to practice EBF⁽³⁴⁾. Notwithstanding, it must not be forgotten that the EBF duration observed in this study is still below the 180 days recommended by the WHO.

Therefore, although higher maternal educational level is a protective factor against early cessation of exclusive breastfeeding, it is still necessary to understand other factors that are associated with good EBF practices, which is essential to enable planning of public healthcare actions involving more effective interventions, whether in hospitals and healthcare centers, or in the infants' social environments.

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