

Original Article

Breastfeeding and Pacifier use in Brazil

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Abstract. Objective: To determine the relationship between pacifier use and the duration of exclusive breast-feeding in the first six months of age, among poor children with unfavourable birth weight, from an underdeveloped region in Brazil. **Method:** Prospective cohort study with infants followed from birth to 6 months of age. Healthy children born with unfavourable birth weight (< 3,000), being exclusively breastfed, were selected from 8 maternity hospitals in the city of Fortaleza (Brazil) between November 1996 and April 1997. Two main outcome measures were used: (i) time to stop exclusive breast-feeding at the 1st and (ii) at the 6th month of life. Main exposures were pacifier use at 1st and 6th month of age. Data were collected at maternity hospitals and during home interviews, using structured questionnaires, by trained data collectors unaware of the study aims, and analyzed using survival analysis and the Cox Proportional Hazard Model. **Results:** 500 children were enrolled and 13% were lost to follow up at the 1st month. Most of the families had a monthly income less than five times the minimum wage. One third of the mothers were adolescents, one fifth were working outside the home by the 6th month and most attended prenatal care visits. Approximately 60% of the children were using pacifiers by the 1st month. The average number of days for exclusive breast-feeding for pacifier use by the 6th month was 125.3 compared to 87.0 among non-users ($p=0.0001$). Children using pacifiers were 1.9% more likely to have stopped exclusive breastfeeding by the 6th month compared to non-users, even after controlling potential confounders. **Conclusion:** Pacifier use was associated with the early termination of breast-feeding in Brazil, among poor children with unfavourable birth weight, living in an underdeveloped area. As a possible marker of early weaning, pacifier use can help health workers identify those mothers in need of extended counselling to reinforce breast-feeding practices. [*Indian J Pediatr* 2005; 72 (3) : 13-16] E-mail : acunha@hucff.ufrj.br

Key words: Breastfeeding; Infant nutrition; Weaning; Pacifier use

Malnutrition, acute respiratory infection and diarrhoea are still major killers in most developing countries,¹ affecting mainly young children and those born with low birth weight. Infants with unfavourable birth weight, those born with less than 3000 g, are also a high risk group for mortality and in many settings may account for a higher number of deaths compared to infants with low birth weight due to higher prevalence.²

Breast-feeding can contribute to the reduction of mortality and morbidity due to those major killers³ and may have a greater impact in reducing mortality in infants with unfavourable birth weight. Pacifier use has been associated with early weaning^{4,6} and some attempts have been made to reduce its use such as the 10 step dissemination, proposed by Unicef to improve breast-feeding rates.⁷ Reducing pacifier use could ultimately increase breast-feeding rates decreasing mortality and morbidity in children.⁸

Most of the evidence showing that pacifier use leads to early weaning was obtained from studies conducted in children born with normal weight and/or from middle and high income families living in more developed regions.⁹⁻¹⁰ The present study is aimed to determine the relationship between pacifier use and the duration of

exclusive breast-feeding in the first six months of life, among children born with unfavourable birth weight and coming from low income families living in an underdeveloped region in Brazil.

METHODS

Data from this analysis came from a randomized and controlled trial conducted with a group of mothers and their newborns, to assess the impact of lay counselling on breast-feeding rates.¹¹ We analyzed data from the non-intervention group. Infants were followed from birth to 6 months of age. A sample of mothers and their babies was selected from 8 maternity hospitals from the Unified Health System (Sistema Único de Saúde - SUS) in the city of Fortaleza, Brazil. These hospitals provided care primarily for pregnant women of lower socioeconomic class, and to 65-70% of those children born in the city with less than 3,000 g.¹² Fortaleza is the capital of Ceara, a state with approximately seven million inhabitants located in the northeast of Brazil, one of the poorest regions of the country.¹³ In 1987, infant mortality rate was approximately 104%, with 54% of those deaths due to diarrheic diseases. Presently, the infant mortality rate is around 30%, and diarrhoea still represents approximately 20% of the causes of death in infants less than one year of

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age.¹⁴ The inclusion criteria used: were a) mothers who had given birth in maternity services selected and whose newborns had birth weight of less than 3,000 g (unfavourable birth weight); b) newborns in good health and with expected release from the maternity service, as determined by the medical team of the nursery, before the fifth day of life; c) mothers residing in the city of Fortaleza who had no plans to change residence within the next six months. Excluded were mothers with twin gestations, newborns with health problems that required intermediate or intensive care, and mothers that resided in other locations or that had serious health problems requiring some form of in-patient treatment. The present study main outcome measures were time to stop exclusive breast-feeding at the first and at the 6th month of children's age. Exclusive breast-feeding was present if the child received only breast milk from its mother or wet nurse, or collected breast milk, and did not receive any other liquid or solid food, with the exception of vitamins, mineral supplements or medication.¹⁵ Main exposure measures were pacifier use at the 1st and the 6th month of age. Other variables included information on family income, maternal schooling, demographic conditions, prenatal care and conditions surrounding the pregnancy, characteristics and health condition of the newborn, were also collected.

Data were collected at the maternity hospitals within the first 24 hours of birth and during home interviews conducted at the 1st and the 6th months after enrolment. Structured questionnaires were used, by trained data collectors unaware of the study's aim. In order to select the study population, four interviewers (two nurses and two social workers) visited the maternity services daily from November 1996 to April 1997. Mothers fulfilling the inclusion criteria were interviewed during the initial 48 hours after childbirth. Home visitation activities included: interviews with the mother; observation of the home environment; observation of all aspects involved with the breast-feeding, including technical ones, as well as those related to the mother-child relationship. The hazard ratio was used as the measure of association and a survival analysis was conducted using Kaplan Meier curves and the Cox Proportional Hazard Model. The variables studied were: potential confounders: mother's age (adolescent), mother working outside home, prenatal care quality, children's hospitalization during the first month or the first 6 months, current pregnancy at the first and at 6 months. For statistical inference Wilcoxon test, Log Rank test, maximum likelihood ratio test and confidence intervals were used. The level of significance was 0.05. The Ethics Committee of the School of Medicine from the Federal University of Ceará approved the study. An informed consent was obtained from mothers before their participation.

RESULTS

500 children at the maternity hospitals were enrolled 64

(13%) were lost to follow up by the 1st month and 112 (22.4%) by the end of the 6th month. Children lost did not differ substantially from those that continued the study in relation to mothers age, mothers work or prenatal care attendance. Seven children died (1.4%) during the study period. Most children came from a very low socioeconomic status: 87% of the families had a monthly income less than 5 times the national minimum wage at that time. One third of the mothers were adolescent and one fifth was working outside home at the 6th month. Most mothers attended prenatal care visits. However, only one fifth received what was considered by the authors as good quality prenatal care, which included among other activities breast-feeding counselling. (Table 1). By the 1st month only half of the children were still exclusively breastfed and this rate dropped to 6% by the 6th month. The use of a pacifier was very common, with more than 50% of the children using it at both intervals (Table 2). Mothers reported that most children had started using pacifiers during the first month of life. The average number of days for exclusive breast-feeding, comparing pacifier usage and non-usage at the 1st and 6th month of life was statistically and significantly different (Table 3). The hazard ratio comparing time to stop breast-feeding among pacifier users and non-users was also statistically

TABLE 1. Study Sample Characteristics

	n	%
Mother's age:		
Adolescent (<20y)	150/500	30.0
Mother's work:	303/377	19.6
Outside home		
Prenatal care (PN):		
Mother received	471/497	94.6
Good PN Care	134/500	26.8
New pregnancy:	19/376	5.0
At 6th month		
Child hospitalized:	46/373	12.3
First 6 months of life		
Family income (monthly):		
< 5 times the minimum wage	435/500	87.0

TABLE 2. Breast-feeding Practice and Use of Pacifiers at 1st and 6th Months

	n	%
Breast-feeding at:		
1st month	189/436	43.3
6th month	31/388	6.0
Use of pacifier at:		
1st month	252/429	58.7
6th month	229/376	60.9

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TABLE 3. Breastfeeding Rates at 1st and 6th Month and Pacifier use

Use of pacifier at:	Breastfeeding duration		
	Average # days	sd ¹	p value ²
1st month			
User	90.9	4.0	0.002
Non-user	123.3	5.0	
6th month			
User	87.0	4.9	0.0001
Non-user	125.3	3.8	

¹sd: standard deviation

²Wilcoxon Test

TABLE 4. Hazard Ratios¹ for Breast-feeding Duration and Use of Pacifiers.

Use of pacifier at:	Hazard Ratio (CI) ²	
	Non-adjusted	Adjusted ³
1st month	1.5 (1.2-1.9)	1.6 (1.3-2.0)
6th month	1.8 (1.4-2.2)	1.9 (1.5-2.4)

¹Results from Cox modelling; ²CI=95% confidence interval

³Adjusted for: mother's age, mother's working outside home, quality of pre-natal care, children's hospitalization the first six months of life, new pregnancy during the 6 months.

significant and remained so even after adjusting for potential confounders. Children using pacifiers were 1.9% more likely to have stopped exclusive breast-feeding at the 6th month compared to non-users (Table 4).

DISCUSSION

It was found that pacifier use was associated with early weaning at the 1st and at the 6th month of age among poor children living in an underdeveloped region in Brazil, where the infant mortality rate is the highest in the country. Although previous studies have shown that pacifier use is associated with early weaning, few studies were conducted in less developed countries or with children from low-income families in developing countries. In Brazil, studies that reported this association were conducted in the southern part of the country, the most developed region with the lowest infant mortality rate in Brazil.⁸ In addition, most studies showing an association between pacifier use and early weaning were conducted on healthy children born with normal weight.^{9,10} The present study examined the association of pacifier use to early weaning in poor children, living in an underdeveloped region where mortality rate was high, and also born with unfavourable birth weight (< 3000 g). Therefore the present study results support that this association persists despite those conditions.

A major discussion, however, is whether pacifier use is only a marker to early weaning and is not casually related to it, as suggested by some authors.^{16,17} The present study, as most others addressing the same question, had an

observational design. Even after controlling potential confounders, evidence was not strong enough to confirm a causal relationship. The only randomized clinical trial examining the association was conducted in a developed country and the results suggested that pacifier use might only be a marker.¹⁸ In addition, other potential confounders, not measured by the authors and not included in the analysis, could have explained part of the association found. The authors also did not measure and consider for how much time a pacifier was used by children. It seems that occasional pacifier use has no effect on breast-feeding duration.¹⁷

It is important, however, to consider the potential role of pacifier as a marker. Even if not causally related, the use of pacifier may indicate to health workers that further action should be taken to prevent early weaning. Mothers may be reluctant to stop giving pacifiers to their children. However, additional counselling should be provided, as there is evidence that it may be a powerful strategy to prevent early termination of breast-feeding and decrease early weaning rates.¹⁹ Health related strategies with emphasis on counselling, such as the Integrated Management of Childhood Illness²⁰ proposed by the WHO and UNICEF, could contribute to this aim if fully implemented in developing countries or in areas with low breastfeeding rates.

In conclusion, the present study provided evidence that pacifier use is associated to early weaning in poor children with unfavourable birth weight, living in an underdeveloped region in Brazil. If used as a flag, pacifier use could alert health workers to the need of more counselling to prevent early weaning.

REFERENCES

1. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003; 361: 2226-2234.
2. Puffer RR, Serrano CV. *Características del peso al nacer*. Washington, Organización Panamericana de la Salud, 1988; 112. (Scientific Publication 504).
3. Victora CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AM *et al*. Evidence for protection by breastfeeding against infant deaths from infectious diseases in Brazil. *Lancet* 1987; 2 : 319-321
4. Howard CR, Howard FM, Lanphear B, deBlicke EA, Eberly S, Lawrence RA. The effects of early pacifier use on breastfeeding duration. *Pediatrics* 1999; 103(3) : E33
5. Aarts C, Hornell A, Kylberg E, Hofvander Y, Gebre-Medhin M. Breastfeeding patterns in relation to thumb sucking and pacifier use. *Pediatrics* 1999; 104(4): E50.
6. Vogel AM, Hutchison BL, Mitchell EA. Factors associated with the duration of breastfeeding. *Acta Paediatr* 1999; 88(12): 1320-1326.
7. ORGANIZACIÓN MUNDIAL DE LA SALUD. *Evidence for the ten steps to successful breastfeeding*. Geneva: Division of Child Health and Development; 1998; 111. (WHO/CHD/98.9)
8. Soares, ME, Giugliani ER, Braun ML, Salgado AC, de Oliveira, AP, de Aguiar, PR. Pacifier use and its relationship with early weaning in infants born at a Child-Friendly Hospital. *J Pediatr* (Rio J) 2003; 79 (4): 309-316.
9. Vogel AM, Hutchison BL, Mitchell EA. The impact of pacifier

- use on breastfeeding: a prospective cohort study. *J Paediatr Child Health* 2001;37(1):58-63
10. Dewey KG, Nommsen-Rivers LA, Heinig MJ, Cohen RJ. Risk factors for suboptimal infant breastfeeding behaviour, delayed onset of lactation, and excess neonatal weight loss. *Pediatrics* 2003; 112 : 607-619.
 11. Leite AM, Tavares M, Cunha AJLA. Effectiveness of Home-Based Peer Counselling to Promote Breastfeeding in the Northeast of Brazil: a Randomized Clinical Trial. *J Pediatr (Rio J)* 2000; 76 supl 1): S 63
 12. Leite AJM, Marcopito LF, Diniz RLP, Silva AVS, Souza LCB, Borges JC *et al*. Perinatal deaths in the municipality of Fortaleza: how many is it possible to avoid? *J Pediatr (Rio J)* 1997; 73(6): 388-394.
 13. Silva AC *et al*. *Viva Criança: Os caminhos da sobrevivência infantil no Ceara*. 1ª. ed. Fortaleza: Demócrito Rocha; 1999.
 14. McAuliffe J, Correia L, Victora CG. Segunda Pesquisa de Saúde Materno-Infantil do Ceará- PESMIC 3, 1990. Fortaleza: Project HOPE, 1994.
 15. Organización Panamericana de la Salud. Organización Mundial de la Salud. Indicadores para Evaluar las Practicas de Lactancia Materna. Ginebra, jun 1991
 16. Benis MM. Are pacifiers associated with early weaning form breastfeeding? *Adv Neonatal Care* 2002; 2(5) : 259-266.
 17. Ullah S, Griffiths P. Does the use of pacifiers shorten breastfeeding duration in infants? *Br J Community Nurs* 2003; 8(10) : 458-463.
 18. Kramer MS, Barr RG, Dagenais S, Yang H, Jones P, Ciofani L *et al*. Pacifier use, early weaning, and cry/fuss behaviour: a randomized controlled trial. *JAMA* 2001; 286(3) : 322-326.
 19. Santiago LB, Bettiol H, Barbieri MA, Guttierrez MR, Del Campo LA. Promotion of breastfeeding: the importance of paediatricians with training. *J Pediatr (Rio J)* 2003; 79(6) : 504-512.
 20. Gove S. WHO Working Group on guidelines for IMCI. Integrated Management of Childhood Illness by outpatient health workers: technical basis and overview. *Bulletin of the World Health Organization* 1997; 75 (Supple 1): 7-24.

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