Breast-feeding among the urban poor in southern Brazil: reasons for termination in the first 6 months of life

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A study of breast-feeding practices over the first 6 months of life among a cohort of urban poor infants in southern Brazil indicated that the median duration of breast-feeding was 18 weeks, and at 6 months 41% of the infants were still being breast-fed. The duration of breast-feeding was significantly associated with the following: the infant's sex, mother's colour, type of first feed, timing of the first breast-feed, breast-feeding regimen and frequency of breast-feeding at 1 month, and the use of hormonal contraceptives by the mother. The following were significant risk factors for early termination of breast-feeding: the infant's sex, type of first feed, use of supplementary feeds, frequency of breast-feeding, feeding regimen, weight-for-age, and weight-for-age after controlling for birth weight. Dissatisfaction with their infant's growth rate was the most frequent reason given by mothers for supplementing the diets of infants who were exclusively breast-fed in the first 3 months of life. Also, the mothers' perception that their milk output was inadequate was the most frequent reason expressed for stopping breast-feeding in the first 4 months.

The roles of health services and family support in providing favourable conditions for increasing the duration of breast-feeding in the study population are discussed, as well as the possibility of bias being introduced into studies of the relationship between infant feeding and growth by the effect of the infant's rate of growth on the mother's decision to continue breast-feeding.

Introduction

Urbanization is progressing rapidly in Latin America, and in southern Brazil nearly 70% of the population already lives in cities.[a] The poor represent a large fraction of this urban population; for example, in Pelotas (population: 260 000), >70% of the population belong to families whose income is under US$ 150 per month, an amount considered to be the poverty level for Brazil (Prefeitura Municipal de Pelotas, unpublished data, 1982).

The duration of breast-feeding in urban areas of Brazil is relatively short. Inappropriate hospital maternity practices, lack of cultural support, emotional stress, pressure of advertising by infant-food companies, mother's work located away from home, and the use of hormonal contraceptives are some of the factors associated with urbanization that can lead to a reduction in the prevalence and duration of breast-feeding (*3, 8, 9, 11, 14, 15, 17, 18, 20–25, 27, 29, 32*).[b] Few detailed data are available, however, on the infant feeding practices of the urban poor or the factors that influence the mother's choice of feeding mode as the infant grows (*2*).

We have recently followed a cohort of infants from Pelotas from birth until 6 months of age to study the adoption of infant feeding patterns by the urban poor and the effect of these patterns on the subsequent growth and diarrhoea morbidity of the infants. Here, we present our findings on the initiation of breast-feeding, the factors that affect its duration, the reasons stated by mothers for introducing food supplements and for stopping breast-feeding, and their opinions as to why other women may stop breast-feeding earlier than is desirable.

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[a] **Victora, C.G.** *The epidemiology of child health in southern Brazil. The relationships between mortality, malnutrition, health care and agricultural development.* Ph.D. thesis, University of London, 1983.

[b] **Helsing, E.** Feeding practices in Europe—beliefs and motivations and possibilities for change. *International Symposium on Infant and Early Childhood Feeding, Michigan, 1978* (unpublished document).

Methods

A cohort of 538 infants born between 4 November 1985 and 19 January 1986 who lived in the urban area of Pelotas was followed prospectively during the first 6 months of life. Eligible infants were healthy singletons who weighed >1500 g from urban families with incomes of less than four times the minimum wage for Brazil, i.e., families with total monthly incomes <US$ 200.

The cohort was recruited from the three hospitals where 99% of all infants born in Pelotas are delivered. In the first 12 hours after delivery, all mothers were informed of the general objective of the project, which was stated to be the study of the health of infants during the first 6 months of life. All those who satisfied the selection criteria were asked to participate: none refused at this stage and 538 infants were recruited, 434 of whom were randomly assigned for intensive investigation and were visited weekly at home for 6 months. The remaining 104 infants formed a control group to assess any bias that might be caused by repeated visiting. Infants in this group were visited only twice—once during the first week and subsequently during the 26th week of the study. A complete data set was collected for 406 infants in the study and for 100 in the control group. The overall refusal rate for the study group was 3.0%, while the refusal rate at the first home visit was 0.8% for the control group and 0.9% for the study group. Three infants in the study group died during the follow-up period.

Differences in the socioeconomic and demographic data and in the prevalences of breast-feeding at the first and 26th weeks for the study and control groups were not statistically significant, and it thus appears that the repeated visits to the families in the study group did not exert a significant bias on the feeding mode they adopted.

Standardized pre-coded questionnaires were used to collect the following information:

- *In hospital.* Maternal characteristics (age, parity, date of previous delivery, weight, and height); antenatal and perinatal data (frequency of antenatal consultations, history of diseases and smoking during pregnancy, type of delivery, and birth weight and birth length); and family income.
- *At home (weekly).* Types of food given to the baby during the previous 24 hours; frequency of feeding and the reason(s) for introducing supplements or ceasing breast-feeding during the preceding week; any illness of the mother or infant during the same period, including a day-by-day recall of the occurrence of diarrhoea and (if diarrhoea was reported) a recall of severity signs.
- *At home (monthly).* Food hygiene (preparation and storage of foods); whether mothers worked outside the home; how mothers perceived family support and domestic work-load, and their use of contraceptives.
- *At home (first and 26th weeks).* Socioeconomic and environmental information (parental education, family composition and income, parental occupation, type of housing, water supply, sanitation, and type of household goods owned).

The weight of infants in the study group was measured weekly to within 0.1 kg using a portable spring scale, while their length was measured monthly to the nearest millimetre with a locally constructed AHRTAG (Appropriate Health Resources Technologies Action Group) measuring board. On each occasion two measurements of length were obtained, and their mean value was used in the analysis. Subroutines obtained from the Centers for Disease Control, Atlanta, GA, USA, were used to determine *Z*-scores, centiles, and percentages of the median values for weight-for-age, length-for-age, and weight-for-length according to the National Center for Health Statistics (NCHS) standards (*10*). Gestational age was determined using the Dubowitz method (*6*).

In order to check the reliability of the data collected, 1% of the interviews were conducted in the presence of a supervisor. The responses of the interviewees were recorded independently, and measurements of weight and length were made by both the field worker and supervisor: the level of agreement for responses was 96% (100% for feeding mode), while the mean difference in weight measurements was 0.01 kg (standard deviation (SD) of the difference = 0.10) and the mean difference in length was 0.14 cm (SD of the difference = 1.17). In order to gauge the regularity of the home visits throughout the study and to detect any strains in the relationship between the field workers and the families, each month 20% of the families were revisited independently by a supervisor.

Infants were grouped into the following broad feeding-mode categories for the analysis: exclusively breast-fed (those who received only breast milk or breast milk and water, tea, or juice); partially breast-fed (those who received breast and other milk or semi-solids); and not breast-fed. Infants who were still being breast-fed at the end of the study were considered to have been breast-fed for 26 weeks (although their total period of breast-feeding might have been longer).

Statistical analysis of the data was carried out using the SPSSX (*26*) and GLIM (*4*) software packages. Relative risks were determined using a logistic regression analysis and a correction was included for outcomes of frequencies >10% in order to obtain estimates of relative risk rather than odds ratios (*31*).

Results

Description of the cohort

A complete set of data was obtained for the 406 infants in the study group who were visited throughout the 26 weeks of the study, and Table 1 shows their sex, gestational age, and birth-weight distributions, as well as information on the mode of delivery, type of first feed, family income, and mother's age and education level.

Factors that influenced the duration of breast-feeding

The median duration of breast-feeding was 18 weeks. Only nine of the 406 study infants were never breast-fed but these did not differ significantly from the rest of the cohort for the variables studied—although they tended to be heavier at birth, were more likely to have been delivered by caesarean section and usually had taller mothers.

At the end of the study 168 infants (41%) were still being breast-fed. The socioeconomic, educational, and environmental variables for these infants did not differ significantly from those of the rest of the cohort; however, girls, infants who had received breast milk as their first feed, those whose mothers were black, those who were breast-fed more frequently in the first weeks of life or who had achieved a higher weight-for-age at 1 month and 3 months, those who did not receive supplementary water when 1-week old, or whose mothers did not use estrogen-based contraceptives tended to be breast-fed for longer. The nine infants who were still being exclusively breast-fed had a greater birth weight, greater weight-for-age at 3 months, and greater weight-for-age at the final home visit.

Table 1: **Distribution of selected characteristics of the 406 infants in the study cohort**

Variable	Percentage
Sex	
Male	49.3
Female	50.7
Gestational age	
<37 weeks	9.1
>37 weeks	90.9
Birth weight	
<2500 g	8.6
2500–2999 g	30.8
3000–3499 g	38.7
>3499 g	21.9
Type of delivery	
Caesarean	23.1
Other	76.9
First feed	
Breast milk	85.5
Other	14.5
Family income range	
<1 minimum wage	10.1
1–2 minimum wages	46.6
>2 minimum wages	43.3
Mother's age	
<20 years	13.8
20–24 years	32.5
25–29 years	28.8
>29 years	24.9
Mother's education	
0–3 years	22.4
4–6 years	45.8
>6 years	31.8

Fig. 1 shows the distribution of infants according to feeding mode at each month of the follow-up, while factors that were related to the duration of breast-feeding (up to 26 weeks) are presented in Table 2. An increased duration of breast-feeding was associated with the following: starting breast-feeding in the first 12 hours of life, giving breast milk as the first feed, breast-feeding on demand, and giving more than seven feeds a day. In addition, as mentioned above, female infants, those whose mothers were black, or those whose mothers did not use estrogen-based contraceptives were, on average, breast-fed for longer. In contrast, there was no significant association between duration of breast-feeding and family or per caput income, infant's birth weight, gestational age, mother's age, education level, parity, and whether she smoked during pregnancy or worked away from home.

The risks of terminating breast-feeding before 1 month, at 1–3 months, and at 3–6 months for infants who were initially breast-fed, those still being breast-fed at 1 month, and those still being breast-fed at 3 months, respectively are shown in Table 3. Family income, mother's age, education, parity, whether she smoked during pregnancy, or worked away from home were not significant.

The risk of stopping breast-feeding in a given month was also associated with the change in weight-for-age up to the preceding month relative to that at birth (Table 4). Infants whose weight-for-age in the preceding month was lower than that at birth were consistently at a higher risk of stopping breast-feeding throughout the first 6 months of life, but this risk was significant only up to the fourth month.

Reasons for starting supplements and for stopping breast-feeding

In the 3 months after delivery, the most frequent reason given by mothers for starting to use supplements was the perception that their children exhibited unsatisfactory growth (Table 5). Insufficient or poor quality milk was the second most fre-

Fig. 1. **Distribution of feeding modes among the study infants during the follow-up period.**

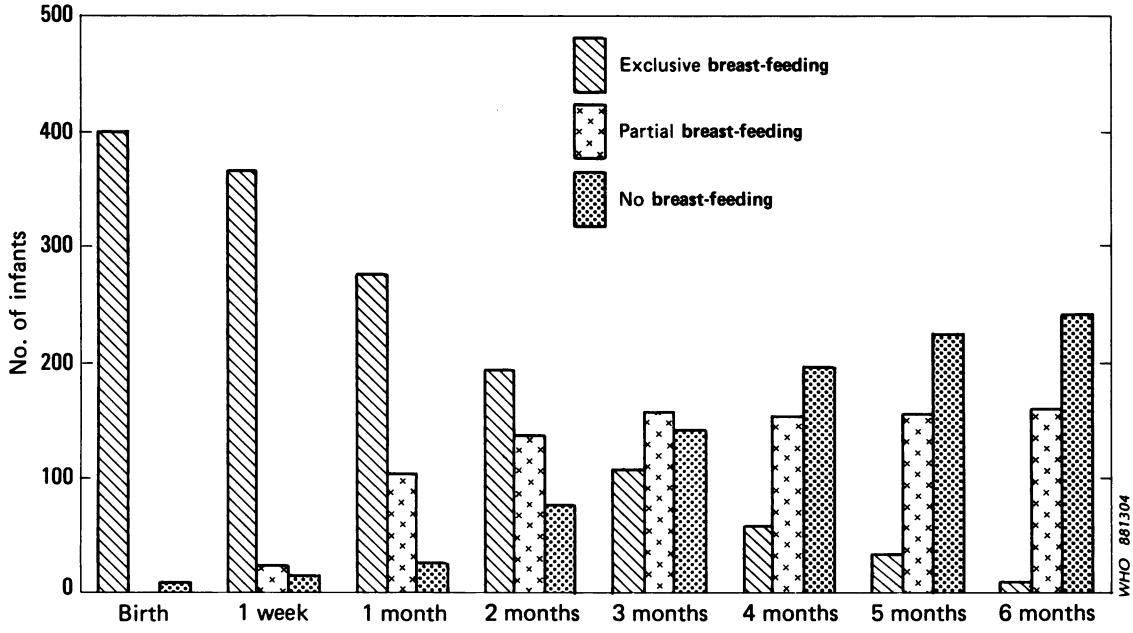

Table 2: **Factors associated with the duration of breast-feeding in the study**

Variable	Mean duration (weeks)	*n*	Significance
Sex			
Male	15.9 (8.58)[a]	200	$P < 0.007$
Female	18.2 (8.64)	206	
Mother's colour			
Black	19.4 (7.83)	103	$P < 0.006$
White	16.4 (8.72)	264	
Mixed	15.8 (9.56)	39	
First feed[b]			
Breast milk	18.1 (8.24)	343	$P < 0.002$
Other	14.1 (8.20)	47	
Time (after birth) of first breast-feed[b]			
0–12 hours	18.0 (8.16)	308	$P < 0.04$
>12 hours	15.9 (8.77)	82	
Breast-feeding regimen at 1 month[c]			
On demand	18.4 (7.94)	332	$P < 0.03$
Schedule	15.8 (8.02)	48	
Frequency of breast-feeding at 1 month[c]			
1–4 times/day	10.3 (7.88)	27	$P < 0.0001$
5–7 times/day	15.7 (8.18)	83	
>7 times/day	19.6 (7.30)	270	
Use of contraceptives at 2 months[c]			
None	20.1 (6.69)	208	$P < 0.0001$
Progestin only	22.4 (5.37)	67	
Estrogen–progestin	18.6 (6.98)	30	
Estrogen–progestin (low dosage)	15.0 (6.56)	24	

[a] Figures in parentheses are standard deviations.
[b] Excluding infants not breast-fed in first week.
[c] Excluding those infants not breast-fed at the age indicated.

Table 3: **Relative risk associated with stopping breast-feeding by 1 month, 3 months, or 6 months after delivery**

Variable	Relative risk of stopping breast-feeding by:[a]		
	1 month	3 months	6 months
Mother's colour			
White	1.00	1.00	1.00
Black	0.36 (0.05–2.63)[b]	0.67 (0.44–1.02)	0.79 (0.55–1.15)
Mixed	3.88 (1.39–10.80), $P < 0.05$	1.21 (0.76–1.94); N.S.	0.65 (0.31–1.38); N.S.
Sex			
Female	1.00	1.00	1.00
Male	1.40 (0.46–4.29); N.S.[c]	1.39 (1.01–1.93); $P < 0.05$	1.43 (1.04–1.97); $P < 0.05$
First feed			
Breast milk	1.00	1.00	1.00
Other	0.12 (0.01–1.98); N.S.	1.70 (1.21–2.39); $P < 0.05$	1.27 (0.78–2.05); N.S.
Type of feeding[d]			
Unsupplemented	1.00	1.00	1.00
Supplemented	3.70 (1.04–13.15); $P < 0.05$	2.89 (2.16–3.87); $P < 0.00$	3.85 (2.34–6.32); $P < 0.00$
Breast-feeding regimen[d]			
On demand	1.00	1.00	1.00
Schedule	1.51 (0.22–10.56); N.S.	1.17 (0.75–1.83); N.S.	1.57 (1.11–2.23); $P < 0.05$
Frequency of breast-feeding[d]			
1–3 times/day	1.00	1.00	1.00
4–6 times/day	0.03 (0.00–0.20)	0.93 (0.59–1.46)	0.64 (0.46–0.89)
>6 times/day	0.04 (0.02–0.12); $P < 0.00$	0.41 (0.27–0.65); $P < 0.00$	0.29 (0.21–0.41); $P < 0.00$
Mother's height			
<1.55 m	1.00	1.00	1.00
1.55–1.59 m	0.11 (0.02–0.79)	1.00 (0.68–1.48)	1.17 (0.73–1.87)
>1.59 m	0.13 (0.03–0.55); $P < 0.01$	0.88 (0.62–1.26); N.S.	1.20 (0.80–1.81); N.S.
Use of hormonal contraceptives			
None	not applicable	1.00	1.00
Estrogen–progestin	not applicable	0.93 (0.37–2.39)	1.07 (0.67–1.69)
Estrogen–progestin (low dosage)	not applicable	1.85 (1.06–3.42)	2.08 (1.49–2.91)
Progestin only	not applicable	0.90 (0.33–2.21); N.S.	0.79 (0.52–1.21); $P < 0.01$
House-help[d]			
Yes	1.00	1.00	1.00
No	4.32 (1.40–13.29); $P < 0.05$	1.00 (0.72–1.37); N.S.	1.00 (0.68–1.47); N.S.
Weight-for-age			
5th quintile	1.00	1.00	1.00
3rd–4th quintile	0.64 (0.17–2.38)	1.24 (0.74–2.06)	1.12 (0.72–1.75)
2nd quintile	1.27 (0.27–5.88)	1.61 (0.95–2.71)	1.02 (0.59–1.77)
1st quintile	1.48 (0.40–5.42); N.S.	2.03 (1.23–3.33); $P < 0.05$	1.68 (1.07–2.64); N.S.
Weight-for-age[e]			
5th quintile	not applicable	1.00	1.00
3rd–4th quintile	not applicable	1.43 (0.83–2.45)	1.17 (0.75–1.81)
2nd quintile	not applicable	2.01 (1.11–3.65)	1.26 (0.72–2.20)
1st quintile	not applicable	2.72 (1.49–4.98); $P < 0.01$	2.33 (1.61–2.38); $P < 0.01$

[a] Data in the three columns headed 1 month, 3 months, and 6 months refer, respectively, to infants who were initially breast-fed but stopped by 1 month, breast-fed at 1 month but stopped by 3 months, and still breast-fed at 3 months but stopped by 6 months.
[b] Figures in parentheses are the 95% confidence intervals.
[c] N.S. = not significant.
[d] Based on the practice prevailing at 1 week, 1 month, and 3 months in the 1 month-, 3 month-, and 6 month-columns, respectively.
[e] Controlling for birth weight.

quent reason given during the first 2 months, while from the third to sixth months the most frequent reason was that this was the norm or recommended practice for infants of this age.

The median duration of partial breast-feeding was 8.0 weeks. Of the 238 infants who were no longer being breast-fed by the end of the sixth month, 92.0% passed from exclusive to partial breast-feeding before the practice was finally stopped. Also, of the 219 infants who were initially exclusively breast-fed, then received supplements, and later stopped breast-feeding during the 6 months

Table 4: **Relative risk Relative risk of stopping breast-feeding in a given month according to the change in weight-for-age relative to that at birth**

Change in weight-for-age[a]	Relative risk of stopping breast-feeding in: 2nd month	3rd month	4th month	5th month	6th month
Maintained/improved	1.00	1.00	1.00	1.00	1.00
Declined	1.98 (1.01–3.87)[b]	1.84 (1.03–3.28)	2.22 (1.16–4.34)	2.25 (0.91–5.53)	1.37 (0.24–7.79)
Significance	$P < 0.05$	$P < 0.04$	$P < 0.02$	N.S.[c]	N.S.

[a] Expressed as weight-for-age in preceding month minus weight-for-age at birth.
[b] Figures in parentheses are 95% confidence intervals.
[c] N.S. = not significant.

Table 5: **Percentage distribution of the reasons given by mothers for starting supplements, by the month (infant's age) when they were started**

Reason for starting supplements	Age when supplements were started: 1st month	2nd month	3rd month	4th–6th month	Total
Unsatisfactory growth	42.1	45.4	42.7	16.2	38.0 (144)[a]
Insufficient or poor quality breast milk	39.7	35.2	19.8	10.8	28.0 (106)
Common usage + advice	8.3	10.2	28.1	67.6	25.3 (96)
Work	5.0	9.1	8.3	5.4	6.9 (26)
Breast problems	5.0	0.0	1.0	0.0	1.8 (7)
Total	(121)[a]	(88)	(96)	(74)	(379)[b]

[a] Figures in parentheses are the numbers of mothers.
[b] Excluding 19 infants who were never partially breast-fed and eight infants for whom no reason for supplementation was reported.

Table 6: **Percentage distribution of the reasons given by mothers for starting supplements and for stopping breast-feeding, by the month (infant's age) when breast-feeding was stopped**

	Age when breast-feeding was stopped: 1st month	2nd month	3rd month	4th month	5th–6th month	Total
Reason for starting supplements						
Unsatisfactory growth	31.2	40.8	41.3	43.8	48.8	42.5 (93)[a]
Insufficient or poor quality breast milk	37.5	55.1	41.3	37.5	11.6	37.4 (82)
Common usage + advice	18.7	2.0	7.9	14.6	25.6	12.3 (27)
Work	0	2.0	9.5	0	11.6	5.5 (12)
Breast problems	12.5	0	0	4.2	2.3	2.3 (5)
Total	(16)[a]	(49)	(63)	(48)	(43)	100 (219[b])
Reason for stopping breast-feeding						
Insufficient or poor quality breast milk	42.4	70.6	50.8	64.6	45.2	55.7 (132)
Refusal after bottle	6.1	11.8	34.9	16.7	52.4	25.3 (60)
Mother's problems	24.2	11.8	9.5	10.4	0	10.5 (25)
Infant's problems	27.3	5.9	4.8	8.3	2.4	8.4 (20)
Total	(33)[a]	(51)	(63)	(48)	(42)	100 (237[c])

[a] Figures in parentheses are the numbers of mothers.
[b] Nineteen infants were never partially breast-fed, and 168 infants were still being breast-fed at the end of the 6th month.
[c] For one infant the reason for stopping was unknown, and 168 infants were still being breast-fed at the end of the 6th month.

of the follow-up, 93 (42.5%) received them because the mothers considered that their children's growth was unsatisfactory, and 82 (37.4%) because they considered that the quantity or quality of their breasting-milk was inferior (Table 6). For infants who stopped being breast-fed in the first 2 months of life, insufficient quality or quantity of breast-milk was the most frequent reason given for starting supplements, while for those who stopped being breast-fed between the fourth and sixth months, the mother's perception of unsatisfactory growth was the most frequent reason for using supplements.

Unsatisfactory growth was not stated as a reason for stopping breast-feeding (Table 6). Milk of insufficient quantity or quality was the most frequent reason given for stopping breast-feeding during the first 4 months, while thereafter this was replaced by the infant's refusal to take the breast after having started to receive supplementary bottle feeds. In order to reduce any fear they may have had about reproach, mothers were asked at the first and final home visits why, in their opinion, other women stopped breast-feeding earlier than might be desirable. The responses on these two occasions are given in Table 7. During the 6 months, 55.9% of the mothers who responded changed their opinion, and only 5·9% of those who mentioned breast problems in the first interview, referred to this after 6 months. Mothers who had suggested fear of damaging the shape of the breasts or the need for going to work gave the most consistent responses, with 57% restating their original opinion; in contrast, nearly 60% of the mothers who had suggested that a bad relationship with the baby or an inadequate supply of breast milk was the reason for other women to stop breast-feeding changed their opinion during the 6-months' study period. A low level of correlation (Pearson coefficient, $r = 0.20$) was found between the responses of the mothers at the 1-week and 6-month visits when they were asked for how long they thought infants should be breast-fed.

Table 7: **Distribution of reasons given by 406 mothers for other women stopping breast-feeding, as stated at the 1st and the 26th weeks of the study**

Reason	1st week	26th week
Insufficient or poor quality breast milk	104 (29.8)[a]	84 (21.6)
Work	75 (21.5)	109 (28.1)
Damage to shape of breasts	67 (19.2)	78 (20.1)
Problems in the mother–child relationship	62 (17.8)	77(19.8)
Breast problems	17 (4.9)	7 (1.8)
Other	24 (6.9)	33 (8.5)
Total	349[b]	388[b]

[a] Figures in parentheses are percentages.
[b] No reason was given by 57 mothers at first week and by 18 mothers at 26th week.

Discussion

The characteristics of infants born in Pelotas in 1982 have been described by Barros et al. (*5*).[c] The cohort of infants from low-income families of the city that we followed in the present study displayed many similarities with those from the corresponding income range in the 1982 cohort. For example, the prevalences of low birth weight, prematurity and mothers aged <20 years were similar; however, more mothers began to breast-feed in our cohort (97% versus 92% in 1982), and more were still breast-feeding at 3 months (65% versus 54%) and at 6 months (41% versus 30%). These variations may be due to the different methods employed in the two studies—recall over a period ranging from 12 to 27 months in the work reported by Barros and active weekly surveillance in the present study. Alternatively, a real increase in the prevalence and duration of breast-feeding in the population may have occurred in response to changes in hospital practices, with more "rooming-in" and more involvement by health personnel in actively encouraging mothers to breast-feed.

Breast-feeding and mother's colour. The present study is the first that has described a difference in duration of breast-feeding associated with the mother's colour in the south of Brazil. The mean duration of breast-feeding among white, black and mothers of mixed race up to 6 months after delivery remained unaltered after controlling for income and mother's height, education level, parity, and age. White mothers had a 2.8-fold greater risk than black mothers of stopping breast-feeding in the first month. Controlling for family income accounted for the differences in the risk (attributed to colour) of stopping breast-feeding from 1 to 3 months after delivery but not those from 3 to 6 months. Until approximately 1950, wet nurses were still active in the south of Brazil. These tended to be black women, although the low wages offered, rather than any especial lactational capacity, was probably the reason. Black mothers in the study may have benefited from the presence of older women within the extended family who, had they been successful breast-feeders themselves, may have acted as an incentive to continue breast-feeding longer.

[c] **Barros, F.C.** *The epidemiology of perinatal health in southern Brazil: a study of perinatal mortality, low birthweight and utilization of healthcare*. Ph.D. thesis, University of London, 1985.

Breast-feeding and infant's sex. The shorter duration of breast-feeding among male as compared with female infants in the cohort was associated with a lower weight-for-age gain among exclusively breast-fed males aged 1–3 months and 3–6 months and with the earlier use of supplements with males. The higher nutritional requirements of male infants may be an underlying cause of their shorter duration of breast-feeding.

Breast-feeding and maternal height. Mothers who were taller than 1.55 m had a much lower risk of stopping breast-feeding during the first month, a finding that is similar to that reported by Hytten & Thomson in Aberdeen, Scotland (*13*). This could arise because of the association between mother's height and birth weight — mothers of height $\leqslant$ 1.55 m had, on average, infants of lower birth weight. Up to the third week of life, among infants who were exclusively breast-fed, those of lower birth weights were at higher risk of stopping breast-feeding.

Breast-feeding and family support. Several studies have highlighted the importance of family support in establishing successful breast-feeding (*7,14,23*). In the present study, mothers who reported that they did not receive extra help with their household chores during their infant's first week of life had a fourfold greater risk of stopping breast-feeding by 1 month after delivery, and the level of risk was not significantly affected after controlling for socioeconomic status. Presumably, the reduction in stress and fatigue together with the feeling of support that extra help may provide at this critical stage accounts for its positive impact on the continuation of breast-feeding.

Breast-feeding and use of contraceptives. Use of hormonal contraceptives has been associated in many investigations with the disruption of lactation, and the type of contraceptive used can make a significant difference to the outcome of breast-feeding (*1, 12, 16, 19, 30*). In our study mothers who used combined estrogen–progestin contraceptives from the second month onwards, were at higher risk of stopping breast-feeding in the subsequent weeks than those who used contraceptives containing only progestin. Also, mothers who used the latter type of contraceptives had a lower risk of stopping breastfeeding than those who did not use hormonal contraceptives. This finding is consistent with the results of other investigations; for example, increased milk volume has been associated with the use of depot medroxyprogesterone acetate (a drug that was used by some of the mothers in the present study) and, in most of the investigations, no disruptive effects on lactation were described for the low-dose progestin-only contraceptives (*12, 16*). The observation that from the end of the first month mothers who used low-dosage estrogen–progestin contraceptives were consistently and significantly at a higher risk of stopping breast-feeding than those who used other contraceptives highlights the need to reassess its prescription to breast-feeding mothers.

Breast-feeding and the choice of first feed. The choice of the first feed given to the baby proved to be a major factor in determining the duration of breast-feeding. Infants who received breast milk as their first feed were breast-fed on average 6 weeks longer over the first 26 weeks of life than those who received either water + glucose or formula milk. Mothers who did not offer the breast as the first feed were older than average (27 years versus 25 years), more educated (6 years versus 5 years of schooling), and more likely to have delivered by caesarean section (37% versus 21%). The choice of the first feed probably reflects the mothers' willingness to breast-feed and their difficulties in establishing lactation. Even when those infants who were never breast-fed were excluded, the difference in mean duration of breast-feeding (18 weeks versus 14 weeks) that was associated with the type of first feed was still highly significant. The risks of stopping breast-feeding remained higher up to the third month for infants who did not receive breast milk as the first feed, even after controlling for the timing of the first breast-feed. Formula milk or water + glucose tended to be prescribed only in cases where difficulties in establishing lactation had led to a distressed mother or infant. The use of these feeds in hospital may also undermine a mother's confidence in her own ability to nurture her infant, and exposes her at an early and critical stage to the prescription by a health professional of a feed other than breast milk.

Timing, regimen, and frequency of breast-feeding. The timing of the first breast-feed was also significantly related to the total duration of breast-feeding. Babies who were breast-fed within 12 hours of delivery were breast-fed longer (18 weeks versus 16 weeks) than others. The effect of early initiation of breast-feeding on the mother–infant bond, promotion of the mother's confidence, and the stimulation of lactation through suckling could play a significant role in establishing this difference, but after controlling for the effect of the choice of the first-feed, the timing of the first breast-feed became non-significant.

From the first month onwards, babies who were fed on demand were more likely to continue breast-feeding than those fed on schedule. Feeding on demand may reflect the mother's availability for and disposition towards breast-feeding and may also lead to an increased milk output. Also, the mother–infant

relationship may be less tense as a result of demand-feeding, with less irritability on the baby's part; mothers who breast-fed exclusively were more likely to feed on demand. When the effect of the feeding regimen was controlled for feeding mode (whether infants were partly or exclusively breast-fed), the risks were significantly reduced.

The number of breast-feeds in 24 hours was strongly associated with maintenance of breast-feeding. Since a lower frequency of breast-feeding is associated with the introduction of supplements, the relative risks of stopping breast-feeding were recalculated after controlling for feeding mode (whether partly or exclusively breast-fed). The results indicate that the risk became non-significant for periods up to 3 months of age; however, the relative risks remained highly significant for the period 3–6 months. Since heavier babies might suckle more often and more vigorously, and since good nutritional status may have encouraged mothers to continue breast-feeding, the relative risks of stopping breast-feeding, depending on its frequency at the beginning of the period, were recalculated after controlling for weight-for-age. The results obtained remained practically unaltered.

Use of food supplements. Some studies have reported that the introduction of supplements to an infant's diet is detrimental to the continuation of breast-feeding (*3*, *15*, *23*). In the present study, infants who received supplements were at a higher risk of stopping breast-feeding in each of the three periods studied. With the exception of the first month, the effect of supplementation remained significant even after controlling for the frequency of breast-feeding or feeding regimen. There was, however, a reduction in the level of risk after controlling for the frequency of feeds and this accords with the expected effect on the stimulation of lactogenesis of substituting breast-feeds by supplements. Nevertheless, the residual level of significance indicates that other factors are involved in the decision to use supplements, such as the mother's fear of inadequate milk production, her interest in curtailing breast-feeding, or the difficulties experienced by the infant in suckling after being offered bottle feeds.

Nutritional progress of infants. Although the weight gain of their infants was not discussed with mothers, the nutritional progress of infants was an important determinant of whether or not a mother continued to breast-feed. Even after controlling for birth weight, infants who were in the lowest quintile for weight-for-age at 1 month and at 3 months of age had the greatest risk of stopping breast-feeding over the following months. Calculation of the relative risk of stopping breast-feeding according to the month-by-month change in Z-score for the weight-for-age from birth up to the end of the preceding month indicated that infants whose nutritional status had deteriorated relative to that at birth, especially in the first 3 months, were at higher risk of stopping breast-feeding in the following month than those who had maintained or improved their nutritional status.

The influence of the infant's nutritional progress on the continuation of breast-feeding indicates that selection bias may be important in cross-sectional studies of the associations between breast-feeding and nutritional status. If mothers continue to breast-feed because they believe that their babies are growing well, i.e., that their weight is increasing at a rate mothers consider to be satisfactory, the better nutritional status of breast-fed infants in the first months of life may, at least in part, be due to such selection bias. An analysis of weekly weight gains among infants in the study according to feeding mode seems to confirm this hypothesis: breast-fed infants grew faster than non-breast-fed infants during the first 12 weeks of life but not thereafter, although throughout the 26 weeks of the study the breast-fed group had a better nutritional status than the non-breast-fed.

The importance of infants' weight gain, as perceived by mothers, as a determinant of whether to maintain breast-feeding is reinforced when the reasons for the introduction of supplements are examined. Of infants who stopped breast-feeding during the study, 42·5% were perceived by their mothers to have unsatisfactory growth. Too little or poor quality breast milk, given as reasons for supplements, may also reflect a mother's anxiety about the adequacy of her infant's growth. Together, unsatisfactory growth and little or poor quality breast milk accounted for 79.9% of the reasons given for supplementing the diet of infants who stopped breast-feeding in the first 6 months of life, and of the reasons for stopping breast-feeding, 55.7% were attributed to too little or poor quality breast milk.

Mothers at work. Interference with mothers' work was stated as an important reason for other women stopping breast-feeding, particularly when the mothers were questioned 6 months after delivery. However, this reason was rarely mentioned in connection with their own decision to stop breast-feeding and was not significantly associated with the duration of breast-feeding. This discrepancy suggests that some opinions are more strongly held, changing little with experience (such as breast-feeding damaging the shape of the breasts), while others are more easily modified (such as the importance of breast problems as a reason for stopping breast-feeding). The view that breast-feeding interferes with mother's work may fall into the latter category.

Conclusions

The complexity of the breast-feeding process is well reflected in the analysis by the number of variables that were statistically significant. The following factors were significantly associated with the duration of breast-feeding: the infant's sex, mother's colour, type of first feed given to the infants, timing of the first breast-feed, breast-feeding regimen at 1 month, frequency of breast-feeding at 1 month, and the use of hormonal contraceptives by the mother.

The role of the health services is highlighted by the association found between the duration of breast-feeding and the type of first feed in hospital or the type of hormonal contraceptive used. A strongly supportive attitude to mothers who have difficulty in starting breast-feeding while in hospital, discussion of their anxiety, a careful evaluation of when to prescribe feeds other than breast milk, and avoidance of combined estrogen–progestin contraceptives for lactating mothers are all likely to increase the duration of breast-feeding. Health personnel should also inform parents about the association between an increased duration of breast-feeding and frequent breast-feeds, feeding on demand, and delaying the introduction of water and food supplements until infants are more than 3 months old.

The importance of support to the lactating mother at home is highlighted by the high risk of stopping breast-feeding during the first month among mothers who received no domestic help in the first week post-partum.

The association between increased duration of breast-feeding and the infant's nutritional status as well as the frequent claim that unsatisfactory weight gain was the reason for starting supplements suggest that mothers use the infant's perceived weight as a measure of the adequacy of feeding—supplementing or stopping breast-feeding if the change in weight is not perceived as adequate. The study also highlights the need for careful evaluation of the relation between feeding mode and growth since it demonstrates that for a significant group of mothers the perception that their child is not growing well makes them more likely to stop breast-feeding, which could lead to selection bias in cross-sectional studies.

Interventions to promote breast-feeding, if effectively implemented, may significantly reduce infant morbidity and mortality. The determinants of breast-feeding identified in the present study should be taken into consideration in designing such interventions in Brazil and other Latin American countries.

Acknowledgements

This study was financed by the Diarrhoeal Diseases Control Programme of the World Health Organization.

J.C. Martines holds a scholarship from the Brazilian Research Council (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico).

Résumé

Motifs d'abandon de l'allaitement au sein pendant les six premiers mois dans les milieux urbains défavorisés du sud du Brésil

Une étude sur l'allaitement au sein au cours des six premiers mois de la vie a été entreprise dans un milieu urbain défavorisé du sud du Brésil. A cette fin, des visites à domicile hebdomadaires ont permis de suivre une cohorte de 406 nourrissons de la naissance à l'âge de six mois. La durée moyenne de l'allaitement au sein a été de 18 semaines; 9 enfants seulement (2,2%) n'ont jamais été mis au sein, alors que 41% d'entre eux étaient encore nourris de cette façon à l'âge de 6 mois.

On a observé une association significative entre la durée de l'allaitement au sein et le sexe du nourrisson, la couleur de la mère, la nature du premier repas, le temps écoulé entre la naissance et la première tétée, le régime et la fréquence de l'allaitement au sein à un mois et l'utilisation de contraceptifs hormonaux par la mère.

Les facteurs de risque d'abandon de l'allaitement au sein ont été étudiés pour les trois périodes suivantes: premier mois, premier au troisième mois et troisième au sixième mois. Le sexe de l'enfant, la nature du premier repas, l'utilisation de suppléments alimentaires, la fréquence de l'allaitement au sein, le régime d'allaitement, le poids en fonction de l'âge et le poids en fonction de l'âge corrigé du poids à la naissance ont été des facteurs de risque significatifs pendant une ou plusieurs de ces périodes. Il en a été de même pour la couleur de la mère, sa taille, la perception qu'elle avait de l'aide domestique dont elle avait bénéficié au cours de la première semaine après l'accouchement et l'utilisation de contraceptifs hormonaux.

Les mères qui ont commencé à donner des suppléments alimentaires à leur enfant à partir du troisième mois ont le plus souvent justifié cette pratique en disant qu'elles étaient insatisfaites de la croissance de l'enfant. Celles qui ont cessé d'allaiter au cours des quatre premiers mois ont donné comme principale raison qu'elles pensaient ne pas avoir assez de lait. C'est aussi la principale raison donnée lors la première visite hebdomadaire après la naissance quand on a demandé aux mères pourquoi les autres femmes cessaient d'allaiter leur enfant.

L'article examine ensuite dans quelle mesure les services de santé et l'aide apportée à la mère par la famille peuvent créer des conditions favorables à un allongement de la durée de l'allaitement au sein dans ce groupe de population. Il évoque aussi la possibilité que l'influence du taux de croissance de l'enfant sur la décision de la mère de continuer à l'allaiter introduise un biais dans l'étude des relations entre le mode d'alimentation de l'enfant et sa croissance.

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Reprint No. **4962**