



The influence of breastfeeding technique on the frequencies of exclusive breastfeeding and nipple trauma in the first month of lactation

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Abstract

Objective: To investigate the influence of breastfeeding technique on the frequencies of exclusive breastfeeding and nipple trauma in the first month of lactation.

Methods: We searched for unfavorable parameters of breastfeeding (five related to mother/baby positioning and three related to baby's latch on) in 211 mother-baby pairs in the maternity ward and at day 30, at home. We compared the frequencies of these parameters between mothers practicing or not exclusive breastfeeding at days 7 and 30, and between mothers with or without nipple trauma at the hospital.

Results: The number of unfavorable parameters in the maternity ward was similar for mother-baby pairs practicing or not exclusive breastfeeding at day 7 and 30. However, at day 30, it was, on average, lower among those under exclusive breastfeeding, regarding positioning (1.7 ± 1.2 vs 2.2 ± 1.1 ; $p = 0.009$) as well as latch on (1.0 ± 0.6 vs 1.4 ± 0.6 ; $p < 0.001$). The number of unfavorable parameters related to latch on in the maternity ward was similar for women with or without nipple trauma, but women without trauma presented a higher number of unfavorable parameters related to positioning. (2.0 ± 1.4 vs 1.4 ± 1.2 ; $p = 0.04$).

Conclusions: The frequencies of exclusive breastfeeding in the first month and of nipple trauma were not influenced by the breastfeeding technique in the maternity ward, but there was an association between a better technique at day 30 and the practice of exclusive breastfeeding. New studies may help to elucidate whether an improvement in breastfeeding practices over time helps the maintenance of exclusive breastfeeding or whether the introduction of bottle-feeding determines a negative effect on breastfeeding.

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Introduction

Rates of exclusive breastfeeding in Brazil are rising, but still remain much too low, being just 23 days in the state capitals.¹ A number of different factors could be contributing to this situation, one of which is an inadequate breastfeeding technique.²

It is relatively recent the knowledge that correct positioning of the mother/baby pair and effective latch on and suction encourage exclusive breastfeeding. If the mother and/or baby are in positions that make it difficult for the baby's mouth to be adequately positioned in relation to the nipple can result in what is called poor latch on. This, in turn, interferes in the dynamics of suction and extraction of the breastmilk, and can make it less likely that the breast is properly emptied and lead to reduced milk production. As a result, the mother may introduce other foods early, thus

contributing to early weaning.²⁻⁴ One study has shown that guidance on correct breastfeeding technique in the maternity ward can reduce the incidence of women reporting low milk production.⁵ Furthermore, incorrect attachment of the baby to the breast can cause nipple injuries, causing the mother pain and discomfort, which can compromise breastfeeding continuation if not duly corrected.⁵⁻⁷

The number of studies of breastfeeding technique is relatively low and, just two studies into the subject were identified in Brazil.^{8,9} One of the studies considered suckling to be inadequate in 33% of fullterm, healthy newborn infants, evaluated during the first 24-48 hours, with more than half of these cases being due to an incorrect manner in which the infant takes the nipple into its mouth.⁸ The other showed that the mother/baby positioning and attachment observed in the maternity unit were satisfactory in 68 and 82% of cases, respectively.⁹

The present study investigated the influence of breastfeeding technique on the frequency of exclusive breastfeeding and of the occurrence of nipple injuries during the first month of lactation, with the intention of contributing to increased knowledge of the subject, since the existing information in both national and international literature is scarce, as the wide-ranging search (with no data restrictions) performed on the MEDLINE, SciELO and Lilacs databases shows.

Methods

This is a contemporary, observational cohort study involving 211 mother/baby pairs, selected from the postnatal ward at the Hospital de Clínicas in Porto Alegre, which is a general university hospital the majority of whose clients are users of the Brazilian National Health Service (Sistema Único de Saúde). With an average of approximately 4,000 deliveries per year, the hospital is a local center of excellence in breastfeeding, being accredited as a Baby Friendly Hospital since 1997. The hospital has a team of professionals trained and capacitated in the promotion and management of breastfeeding.

The sample was selected during the period between June and November 2003. Every day two mother/baby pairs were selected by lots from those who fulfilled the following study inclusion criteria: healthy mothers and babies, resident in the city of Porto Alegre who had started breastfeeding; single births, with birth weights greater than or equal to 2,500 g. Any pairs who had to be separated, because of problems with either mother or baby, were excluded from the study.

The sample size was calculated based on the following parameters, based on an earlier study¹⁰ and clinical experience: $\alpha = 0.05\%$; $\beta = 20\%$; prevalence of outcome (exclusive breastfeeding) among those not exposed (pairs with a lower than average number of unfavorable parameters) = 70%; prevalence of exposure in the population = 50%; minimum difference in outcome prevalence rates between exposed and not exposed = 20%.

In this manner the minimum sample was estimated at 206 mother/baby pairs.

Two hundred and thirty-three mother/baby pairs were selected for the study, of whom 12 (5%) did not participate because the mother refused and 10 (4%) were lost during follow-up, resulting in a final sample of 211 pair.

Data collection took place in three stages: in the maternity unit, at 7 days and 30 days of life. Data was collected by a duly trained team, consisting of: two nutritionists and a speech therapist (not affiliated with the maternity unit), who were responsible for sample selection, interviewing the mothers, examining breasts and assessing breastfeeding technique in the hospital and in the patients' homes 30 days postpartum; and six medicine and nursing academics, responsible for data collection at 7 days in the patients' homes. The work was divided equally between the team members. A pilot study was undertaken involving 20 mothers in order to test the study logistics and the data collection instruments, after which the necessary adjustments were made.

Between the second and third day after delivery and after the informed consent form had been signed, mothers were interviewed in the maternity unit in order to obtain sociodemographic data and information about the births, their families and their previous experiences with breastfeeding. After the interview, breasts were examined with the objective of detecting nipple injuries (fissures, blisters, marks and/or bruising visible to the naked eye). Next, one complete breastfeeding was observed and five parameters indicative of inadequate mother/baby positioning were checked for: mother not relaxed, with tense shoulders; baby distant from mother; baby's head not aligned with trunk; baby's chin not touching the breast; and baby not firmly supported with only its shoulder and head supported; in addition to three parameters indicative of incorrect attachment: mouth not open wide; lips not flared outwards; and non asymmetrical latch on, with more areolar area visible under the baby's mouth. These items were taken from the breastfeeding evaluation instrument recommended by the World Health Organization.¹¹ In order that the breastfeeding evaluations would be uniform, the three researchers responsible for the assessments (E.W., M.F. and L.O.) underwent training until they reached a level of 90% on interobserver agreement for all of the parameters.

At 7 days of the babies' lives, each mother/baby pair was visited at home in order to obtain information about the child's feeding. At 30 days another home visit was made and data was collected about the child's feeding (using the same questionnaire as on day 7) and another breastfeeding evaluation was performed, using the same methodology and by the same researcher who had done the evaluation at the maternity unit. Since eight mother/baby pairs had already stopped breastfeeding during the first month, breastfeeding assessment was limited to the 203 pairs that were still breastfeeding on day 30.

In accordance with World Health Organization recommendations, children were defined as breastfeeding

exclusively if they received only breastmilk and no other liquid or solid, including water and tea.¹²

The database was created and statistical analyses performed using Epi-Info, version 6.04, and SPSS version 10.0. To assure better data quality, data was entered in duplicate and the two datasets compared. Comparisons were made of the frequencies of the various different parameters observed during breastfeeding between mother/baby pairs who were and were not on exclusive breastfeeding at 7 and 30 days, and between mothers with and without nipple injuries at the maternity unit, using Pearson's chi-square test or the chi-square test with Yates' correction. When a significant association was detected, relative risk was calculated together with its confidence intervals. Additionally, the number of parameters detrimental to breastfeeding were compared, both for mother/baby positioning and latching-on, using Student's t test for independent sample for intergroup comparisons and Student's t test for paired samples for intragroup comparisons. The critical level was set at $p < 0.05$ and 95% confidence intervals were adopted.

The study was approved by the Health Research and Ethics Committee at the *Hospital de Clínicas de Porto Alegre*.

Results

Table 1 lists some characteristics of the 211 mother/baby pairs. Observe that the majority of the sample was made up of adult, white-skinned women, with 8 or more years' education, cohabiting with their children's fathers, who had attended five or more prenatal consultations and whose children had vaginal delivery. The sample was balanced in terms of the children's sex and birth order. The majority of those mothers who already had children had breastfed for more than 6 months. One fact that attracts attention is that

Table 1 - Characteristics of the 211 mother/babies dyads included in the study - Porto Alegre, RS, Brazil - 2003

Variables	n	%
20-year-old or older mother	160	75.8
Caucasian	148	70.1
8 school-years or more	135	64
Couple living together	175	82.9
Mother was given orientation about breastfeeding techniques before the baby was born	36	17.1
Vaginal delivery	151	71.6
First child	99	46.9
Male baby	110	52.1
Mean of previous children breastfeeding period ≥ 6 months	66	58.9
Number of prenatal visits ≥ 6	169	80.1

* Only the 112 mothers who had already had children were considered.

few of the mothers had received prenatal guidance on positioning and attachment during breastfeeding.

The frequency of exclusive breastfeeding at 7 and 30 days, respectively, was 81.5 and 55.9%. The mean number of detrimental parameters related to mother/baby positioning and with latching-on while still in the maternity ward was similar for those mothers who were exclusively breastfeeding and those who already were feeding their children not only on breastmilk, both at 7 and at 30 days. However, by the assessment on the thirtieth day, the mean (Table 2) for the group of mothers/babies exclusively breastfeeding was significantly lower (indicating better technique). When the number of detrimental parameters at the maternity unit were compared with those observed at 30 days, it was found that the mother/baby pairs still on exclusive breastfeeding at 30 days had maintained the number of detrimental positioning parameters ($p = 0.814$), but substantially reduced the number of detrimental parameters related to latching-on ($p < 0.001$). In contrast, the group that was no longer breastfeeding exclusively, had an increased number of detrimental positioning parameters ($p = 0.017$), with no change in the number of detrimental parameters related to attachment ($p = 0.227$). Tables 3 and 4 list the frequencies of the five mother/baby positioning parameters and the three parameters related to latching-on observed at the maternity unit and at 30 days, respectively, classified by type of breastfeeding at 7 and 30 days. Observe that none of the parameters investigated at the maternity unit proved to be related with breastfeeding frequency at 7 or at 30 days. In contrast, the following parameters observed at 30 days were significantly more frequent among the mother/baby pairs who had already abandoned exclusive breastfeeding: head and trunk of the baby out of alignment (RR = 1.5; 95% CI% = 1.2-1.9), mouth not open wide (RR = 2.3; 95% CI% = 1.3-4.2) and attachment that is not asymmetrical (RR = 1.6; 95% CI% = 1.3-1.9).

The incidence of nipple injuries at the maternity unit was 43.6% (92/211). A comparison of the mean numbers of detrimental parameters related to attachment at the maternity unit, among those women who did or did not exhibit mammary damage, reveals that there was no difference with respect of this factor (respectively 1.4 ± 0.6 versus 1.5 ± 0.7 ; $p = 0.189$). However, the number of detrimental parameters related to positioning was significantly lower (better positioning) among those women who exhibited nipple lesions (1.4 ± 1.2 versus 2.0 ± 1.4 ; $p = 0.04$). Since the hospital has a specialized breastfeeding management team, which gives priority to caring for those recently delivered mothers who exhibit breastfeeding difficulties, information was requested on which of the pairs included in the present study had received care from the specialized team. It was found that 52.2% of the mothers with nipple damage had been seen by the specialized team before having their breastfeeding technique assessed for this study, while 38.7% of those who did not exhibit damage had received the same care, a statistically significant difference ($p = 0.05$).

Table 2 - Mean (\pm standard deviations) of the number of unfavorable parameters concerning mother/baby positioning and latch on, according to the presence or absence of exclusive breastfeeding (EB) at 7 and 30 days - Porto Alegre, RS, Brazil - 2003

Parameter assessed	EB at 7 days			EB at 30 days		
	Yes (n=172)	No (n=39)	p *	Yes (n=118)	No (n=93)	p *
Maternity						
Positioning mother/baby	1.8 \pm 1.4	1.6 \pm 1.3	0.655	1.7 \pm 1.4	1.8 \pm 1.4	0.753
Latch on	1.4 \pm 0.7	1.4 \pm 0.6	0.999	1.4 \pm 0.7	1.5 \pm 0.7	0.609
At 30 days						
Positioning mother/baby	-	-	-	1.7 \pm 1.2	2.2 \pm 1.1	0.009
Latch on	-	-	-	1.0 \pm 0.6	1.4 \pm 0.6	< 0.001

* Student's *t* test.

Discussion

This study detected high frequencies of parameters indicative of inadequate breastfeeding technique, related to mother/baby positioning and latching-on. On average, each mother/baby pair exhibited between one and two parameters related to positioning and between one and two parameters related to attachment, both at the maternity unit and at 30 days. The most frequent detrimental parameters, observed in more than half the pairs, were baby's head and trunk not

aligned and attachment that wasn't asymmetrical. This last was observed in almost the entire sample at the maternity unit and in approximately 90% at 30 days. Unfortunately, it is not possible to make comparisons with other studies since the bibliographic review did not encounter publications that described the frequency of the different parameters detrimental to breastfeeding that this study assessed. Although the detrimental parameters were not specified, one study undertaken in Santos-SP also found several

Table 3 - Frequency of unfavorable parameters concerning mother/baby positioning and latch on at maternity, according to the presence or absence of exclusive breastfeeding (EB) at 7 and 30 days - Porto Alegre, RS, Brazil - 2003

Parameter assessed	EB at 7 days – n (%)			EB at 30 days – n (%)		
	Yes (n=172)	No (n=39)	p	Yes (n=118)	No (n=93)	p
Positioning mother/baby						
Mother with tense shoulders	69 (40.1)	10 (25.6)	0.133 *	46 (39.0)	33 (35.5)	0.705 *
Baby's body distant from mother's body	26 (15.1)	3 (7.7)	0.344 †	17 (14.4)	12 (12.9)	0.910 *
Baby's trunk and head not aligned	117 (68.0)	28 (71.8)	0.789 *	80 (67.8)	65 (70.0)	0.860 *
Baby's chin does not touch the mother's breast	39 (22.7)	9 (23.1)	1.000 *	27 (22.9)	21 (22.6)	1.000 *
Baby not adequately hold	50 (29.1)	14 (35.9)	0.519 *	31 (26.3)	33 (35.5)	0.195 *
Baby's latch on						
Mouth not wide open	44 (25.6)	10 (25.6)	1.000 *	32 (27.1)	22 (23.7)	0.679 *
Protruding lower lip	34 (19.8)	7 (17.9)	0.972 *	19 (16.1)	22 (23.7)	0.229 *
Non-asymmetric latch on	169 (98.3)	39 (100.0)	1.000 †	116 (98.3)	92 (98.9)	1.000 †

* Pearson's chi-square test; † Fisher's exact test.

Table 4 - Frequency of unfavorable parameters related to positioning and latch on, observed in 203 mothers and babies at 30 days, according to the presence or absence of exclusive breastfeeding (EB) at 30 days - Porto Alegre, RS, Brazil - 2003

Parameters assessed	EB (n = 118) n (%)	Non EB (n=85) n (%)	p *
Mother/baby positioning			
Mother with tense shoulders	46 (39.0)	36 (42.4)	0.736
Baby's body distant from the mother's body	21 (17.8)	17 (20.0)	0.830
Baby's head and trunk not aligned	61 (51.7)	65 (76.5)	0.001
Baby's chin does not touch the mother's breast	14 (11.9)	19 (22.4)	0.071
Baby not adequately hold	63 (53.4)	47 (55.3)	0.900
Latch on			
Mouth not wide open	8 (6.8)	21 (24.7)	0.001
Non protruding lower lip	9 (7.6)	12 (14.1)	0.206
Non-asymmetric latch on	100 (84.7)	82 (96.5)	0.013

* Pearson's chi-square test.

different types of negative behavior related to breastfeeding technique⁸. In that study the mean score for positioning (from a maximum of 20 awarded to 10 parameters) was 11.5 and for attachment the score (out of a maximum of 10 points awarded for five parameters) was 6.0, and just 0.2% of the sample reached a maximum score for positioning and 2% for attachment. In another Brazilian study, it was reported that 32% of the 50 mother/baby pairs observed in a maternity unit exhibited two or more detrimental behavior traits related to positioning and 18% exhibited two or more parameters detrimental to good latching.⁹

Several different studies suggest that good breastfeeding technique during the first days postpartum is associated with breastfeeding duration. In Switzerland, Righard & Alade⁴ observed that children whose attachment was inadequate (only sucking the nipple) in the day of discharge from the maternity unit had a 10 times greater chance of being given a bottle within the first month when compared with children with adequate latch on or whose attachment was corrected while still in the maternity unit. At 4 months, the prevalence of breastfeeding was 40% in the first group and 74% in the other two. In Australia,⁶ women who had received guidance on positioning and attachment during the 36th week of pregnancy had a greater prevalence of breastfeeding 6 weeks postpartum when compared with a control group (92 vs 29%, respectively). In Bristol,⁵ in the United Kingdom, there was a significant increase in exclusive breastfeeding rates at 2 and 6 weeks postpartum and of breastfeeding at 2 weeks when women were given instruction at the maternity unit on correct breastfeeding, when compared with a population of women who had had their children at the same hospital before the intervention. In Argentina,¹³ the quality of suction was one of five factors

(out of 26 investigated) that was associated with the duration of exclusive breastfeeding. In contrast with the results of these studies, the present study did not find any association between better breastfeeding technique at the maternity unit and less favorable indices of exclusive breastfeeding during the first month. In other words, breastfeeding technique at the maternity unit was not a predictor of exclusive breastfeeding practice. Nevertheless, a significant association was observed between better breastfeeding technique at the end of the first month and greater indices of exclusive breastfeeding on the same day. Those mother/baby pairs breastfeeding exclusively at 30 days presented a significantly lower number of parameters that compromise the quality of breastfeeding technique. During the first month, breastfeeding technique underwent changes, with those pairs on exclusive breastfeeding presenting significant attachment improvements, in contrast with those who had already abandoned the practice who presented a significant worsening in technique. Nevertheless, the study design does not permit investigation of whether the improved technique favored exclusive breastfeeding maintenance or whether it was the interruption of exclusivity, with the introduction of bottle-feeding, that exercised a negative effect on the technique. Righard¹⁴ suggests that children on mixed feeding (bottle and breast) may develop an incorrect breast suckling technique. Some of these children use their tongues as pistons when suckling at the breast, which is normal behavior when sucking at a bottle, but not for the breast. In the present study, those children who were not exclusively breastfed (probably using a bottle) exhibited mouths not open wide and non-asymmetrical latch on with greater frequency, which can impede effective extraction of milk from the breast. If the breast is not

adequately emptied, women tend to produce less milk, which can then result in the need for milk supplementation, which, in turn, may culminate in early weaning.

Another finding that merits emphasis is the elevated incidence of nipple damage, with approximately half of recently delivered mothers exhibiting some type of nipple injury. This factor is in keeping with the fact that approximately 25% of the children did not open their mouths wide and, even more relevant, that just three children latched asymmetrically. Ultrasound studies have shown that when babies latch correctly the nipple is positioned to the posterior region of the palate and is protected from friction and compression which prevents nipple traumas.¹⁵ A number of different studies^{5,6,16} confirm that improved breastfeeding technique results in reduced pain and nipple damage. Therefore, it would be expected that the women with nipple injuries would present a greater number of parameters detrimental to breastfeeding. Paradoxically, women with nipple traumas exhibited, on average, fewer detrimental parameters related to positioning than those without this complication. It is worth pointing out, therefore, that the breastfeeding assessments were carried out on the day that the mothers were to be discharged and that their technique during the first few feeds is unknown. It is very likely that the women with nipple injuries had improved some aspects of their technique during their stays in the maternity unit as a result of having received greater guidance, since the hospital has specialized lactation management care provided by professionals who have obtained the title of International Lactation Consultant, awarded by the IBLCE (International Board of Lactation Consultant Examiners). These professionals prioritize women who exhibit breastfeeding difficulties. Indeed, it was confirmed that women with nipple injuries had received this specialized care with greater frequency, and this, probably, influenced their breastfeeding technique.

This study has the merit of being the first to describe in detail mother/baby positioning and attachment in breastfeeding Brazilian women, detecting an elevated frequency of behavior detrimental to good breastfeeding technique, in particular non-asymmetrical attachment, despite the study having been performed at a Baby Friendly Hospital, with a specialized lactation management team. The data suggest that the instruction offered at the hospital is not sufficient to modify the deeply-rooted habits of women in Brazil, who, when breastfeeding their babies, support their heads with the inside of the elbow of the arm on the same side as the nipple being offered, which, without doubt, makes the type of latch considered most effective more difficult (asymmetrical latch). Furthermore, it is believed that guidance is very often offered once nipples are already injured, since it is common for this to take place during the first feeds. This reinforces the importance of mothers being prepared, while still pregnant, to feed their children in a manner that encourages correct nipple positioning within the child's mouth, thus avoiding the appearance of injuries that can be extremely painful.

This study took certain methodological steps, such as training the researchers responsible for breastfeeding evaluation until they reached a high level of agreement. The fact that the researchers were not affiliated with the Hospital where the research was carried out and also that the assessments at the maternity unit and at home were undertaken by the same researcher for each mother/baby pair without doubt contributed to reducing any possible measurement bias. The ideal would have been for breastfeeding evaluations to have been carried out by two independent observers, but we did not have sufficient human resources available for this.

This study has shown that activities are required that can improve breastfeeding technique, in particular to promote asymmetrical attachment, which is very rare, despite the specialized care available at the maternity unit. For this to occur, it is important to test strategies aimed to improve breastfeeding technique right from the first feeds, and that their effects on the frequency of complications resulting from breastfeeding. It is possible that, by improving breastfeeding technique, mothers can breastfeed in greater comfort, thus increasing the chances of longer and more pleasurable breastfeeding.

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