

# Comparison of the effect of two systems for the promotion of exclusive breastfeeding

Sonia Bechara Coutinho, Pedro Israel Cabral de Lira, Marília de Carvalho Lima, Ann Ashworth

## Summary

**Background** Promotion of breastfeeding is an important child-survival intervention, yet little is known about which promotional strategies are the most effective. We aimed to compare the effects on rates of breastfeeding of two systems for promotion of breastfeeding in Brazil—a hospital-based system and the same system combined with a programme of home visits.

**Methods** In February, 2001, maternity staff from two hospitals in Pernambuco, Brazil, were trained according to the Baby-Friendly Hospital Initiative (BFHI). In a randomised trial between March and August, 2001, 350 mothers giving birth at these hospitals were assigned ten postnatal home visits to promote and support breastfeeding (n=175) or no home visits (n=175). Breastfeeding practices were studied on days 1, 10, 30, 60, 90, 120, 150, and 180 by researchers unaware of group allocation. The primary outcome measure was the rate of exclusive breastfeeding from birth to 6 months. Analyses were by intention to treat.

**Findings** The hospital-training intervention achieved a high rate (70%) of exclusive breastfeeding in the hospitals, but this rate was not sustained at home and at 10 days of age only 30% of infants were exclusively breastfed. The patterns of exclusive breastfeeding in the two trial groups for days 10–180 differed significantly ( $p<0.0001$ ), with a mean aggregated prevalence of 45% among the group assigned home visits compared with 13% for the group assigned none.

**Interpretation** The BFHI achieves high rates of exclusive breastfeeding in hospital; however, in Brazil at least, the rates fall rapidly thereafter. Reliance on the BFHI as a strategy for breastfeeding promotion should be reassessed. A combination of promotional systems (hospital-based and in the community) is needed.

## Introduction

The *Lancet's* Child Survival series<sup>1–5</sup> drew attention to the unacceptably high rates of child mortality that continue in low-income countries and poor areas of middle-income countries. Most of the 10.8 million child deaths during the year 2000 were from preventable causes, especially neonatal disorders, pneumonia, and diarrhoea.<sup>1</sup> If the few interventions for which there is sufficient evidence of effect (level 1)<sup>2</sup> or limited evidence of effect (level 2) were fully implemented, 63% of deaths of children younger than 5 years could be prevented. If 90% of infants were exclusively breastfed at 0–5 months and continued to be breastfed from 6 months to 11 months, there would be an estimated 13% reduction in child deaths worldwide.<sup>2</sup> This potential reduction in mortality is higher than for any other level-1 intervention. Current rates of exclusive breastfeeding are far below 90% in most countries, and in some, for example in Latin America, even the duration of breastfeeding is short.

The third paper in the Child Survival series highlighted the need to consider systems necessary to put an intervention in place.<sup>3</sup> In relation to breastfeeding promotion, there is little information as to which strategies are the most effective in promoting exclusive breastfeeding and achieving high and equitable coverage.<sup>3</sup> We report a randomised trial comparing the effect on rates of exclusive breastfeeding of two systems

to promote breastfeeding in northeastern Brazil. The interventions were a hospital-based system, in which maternity staff were trained with the course content for the Baby-Friendly Hospital Initiative (BFHI), and a combination of this hospital-based system and a community-based system providing ten postnatal home visits. We also examined whether the effect applied equally among families below and above the poverty line and how it was related to maternal education, since the most disadvantaged infants are more likely to be exposed to health risks than those who are more affluent.<sup>4</sup>

## Methods

### Study site and participants

The study was done in the urban areas of Palmares and three neighbouring small towns (Catende, Água Preta, and Joaquim Nabuco) in the interior of the State of Pernambuco, northeastern Brazil. Their combined population is 135 000. The area is hilly and lies 130 km southwest of Recife, the State capital. The climate is hot and humid, and the economy of the region is mostly based on growing and processing sugar cane. Poverty is widespread. The adult female illiteracy rate is around 26%, and the infant mortality rate in 2000 was 76.5 per 1000 livebirths. HIV/AIDS incidence is thought to be very low. Palmares has three public maternity hospitals, although one did not function from August, 2000, when floods destroyed the infrastructure and equipment, until

*Lancet* 2005; 366: 1094–100

Departments of Maternal and Child Health (S Bechara Coutinho PhD, M de Carvalho Lima PhD) and Nutrition (P I Cabral de Lira PhD), Federal University of Pernambuco, Recife, Brazil; and Nutrition and Public Health Intervention Research Unit, London School of Hygiene and Tropical Medicine, London WC1E 7HT, UK (Prof A Ashworth PhD)

Correspondence to: Prof Ann Ashworth ann.hill@lshtm.ac.uk

See [http://www.thelancet.com/collections/series/child\\_survival](http://www.thelancet.com/collections/series/child_survival)

December, 2001. More than 90% of births occur in hospital, and most women in the four towns give birth in Palmares. Midwives are responsible for routine births, and doctors are called for caesarean or emergency deliveries. The usual stay is 24 h after vaginal births and 48 h after caesarean deliveries.

In the preintervention study and in the randomised trial, all singleton infants were eligible except those with congenital anomalies or serious illness necessitating intensive care and those whose mothers had serious disease or mental illness or were planning to leave the area within 6 months. Infants weighing less than 2500 g at birth were excluded from the preintervention cohort.

### Design and objectives

Figure 1 outlines the stages of the study. Preintervention data were obtained for a cohort of infants born in the three hospitals between January and August, 1998. The findings<sup>6</sup> showed that maternity practices were poor, rates of exclusive breastfeeding were very low (median duration 0 days), and the duration of any breastfeeding was short (median 116 days). The second stage (February, 2001) provided maternity staff at the two functioning hospitals with training used by the BFHI. The third stage (March to August, 2001) was a randomised trial in which mother-infant pairs in the hospitals where staff had been trained were randomly assigned either ten postnatal home visits or no home visits. For each cohort, breastfeeding data were collected prospectively for 6 months.

The main objective was to compare the hospital-based intervention (BFHI training of maternity staff) with a combined hospital-based and community-based intervention (BFHI training and postnatal home visits). The primary outcome measure was rates of exclusive breastfeeding from birth to 6 months.

For the trial, mother-infant pairs in the maternity wards in March to August, 2001, were randomised in blocks of ten per town by use of a random numbers table (Epi-Info 6.04). The random numbers were generated by the project manager, and enrolment and group assignment were made by two maternity-based research assistants. Concealment was achieved by drawing numbers from envelopes at the time of assignment. The invitation to participate in the research was given at the maternity hospital before assignment.

WHO definitions were used:<sup>7</sup> infants were classified as exclusively breastfed if they received only breastmilk (no water, other liquids, or solids) and as breastfed if they received breastmilk plus other food or liquid (including other milk). Other milk was defined as any non-breastmilk.

20 h of training were provided for health professionals and support staff of the two functioning hospitals in Palmares in early February, 2001, and 90% of the midwives and nursing assistants attended. Doctors were

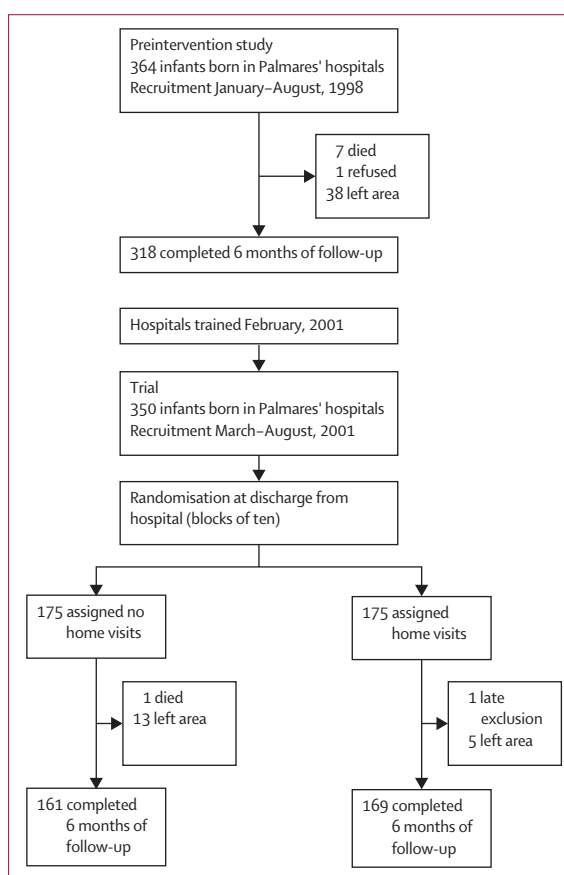


Figure 1: Profile of the preintervention study and randomised intervention trial

invited but did not participate. The training programme was the 18 h UNICEF/WHO course<sup>8</sup> for training Baby-Friendly Hospitals and 2 h focusing on how to listen, to learn from mothers, to establish good relationships, to build mothers' confidence, and to offer support, taken from the WHO/UNICEF Breastfeeding Counselling Course.<sup>9</sup> Training was led by one of us (SBC) who is an accredited lactation counsellor and former BFHI assessor. Copies of the UNICEF norms and routines for the encouragement of breastfeeding were offered to the hospital managers, together with posters, educational folders for mothers, and a Ministry of Health videotape on lactation management. Two copies of the book *Helping mothers to breastfeed*<sup>10</sup> were given to each maternity hospital.

The Ministry of Health has a national programme to deploy community health agents to make home visits, but this programme was not fully established in the study area. Five women were therefore recruited to serve as home visitors for the study. Their educational background (secondary school) was similar to that of community health agents in the national programme and, as for community health agents, personal breastfeeding experience was not a prerequisite. The home visitors received the same 20 h training as the maternity staff plus

5 days in which they studied *Helping mothers to breastfeed*<sup>10</sup> in depth and practised how to discuss key topics with mothers by use of an illustrated booklet.

For the hospital-based intervention, from March, 2001, maternity staff in Palmares were expected to support, guide, and encourage all mothers to initiate and maintain exclusive breastfeeding throughout their hospital stay and at home for 6 months, and to continue breastfeeding for at least 2 years. Skin-to-skin contact in the delivery room, breastfeeding within the first 30 min, rooming-in, help with positioning, correct breastfeeding technique, and no bottles or pacifiers were expected norms, together with other features of Baby Friendly steps 4–9.<sup>11</sup> Staff were expected to show the video daily, to talk to mothers individually answering their questions and discussing doubts, and to advise them to return to hospital if they experienced any breastfeeding difficulties at home.

For the combined hospital and community intervention, from March, 2001, the home visitors were expected to make home visits to mothers who had given birth in Palmares and who had been randomly assigned home visits. They were expected to visit ten times—four times during the first month (on days 3, 7, 15, and 30), every 2 weeks during the second month, and once a month during the third to sixth months. Each mother was to be given the illustrated booklet. At each visit, the home visitors were expected to encourage exclusive breastfeeding for 6 months and continued breastfeeding for at least 2 years, to answer questions and discuss doubts, and to use the booklet as a basis for discussions of key topics relevant to the infant's age. Whenever possible, they observed the positioning of the infant at the breast, flow of milk, and the baby's satisfaction; if there were difficulties that they could not resolve, they were expected to refer the mother for more specialist help at the hospital. If other family members were present, their attitude towards exclusive breastfeeding was assessed and their support was sought, including help with household chores. Each visit had a mean duration of 30 min, with the initial visits taking longer than later ones.

Data were collected in the trial by four researchers who were not aware of group allocation and were unconnected with the delivery of the interventions. Mothers in the trial were not close neighbours, so discussion with other mothers is unlikely, but we did not formally assess whether masking was maintained.

Information on maternity-ward practices was obtained through interviews with mothers in the maternity ward (preintervention cohort) or at home (trial) and included delivery-room practices, rooming-in, assistance given in establishment of breastfeeding (positioning, manual expression), and advice given about feeding other liquids and use of bottles and pacifiers.

Breastfeeding practices up to 6 months were assessed, starting in the maternity ward (day 1). In the pre-intervention study, households were visited twice a week for 6 months.<sup>6</sup> For the trial, data were obtained at home on

days 10, 30, 60, 90, 120, 150, and 180. Information was obtained by means of a structured questionnaire on breastfeeding and use of water, tea, other liquids, other milk, pacifiers, and bottles in the previous 24 h. The time of their first introduction was also recorded.

Information on sociodemographic and environmental characteristics was obtained at delivery by means of precoded, structured questionnaires. The data included information about income, parental education and literacy, family structure, household possessions (television, radio, refrigerator), housing quality, water supply, sanitation, and waste disposal.

Permission was granted before the study by the Ethical Committee of the Federal University of Pernambuco. All mothers gave fully informed written consent.

### Statistical analysis

For the preintervention study, 364 mother-infant pairs were recruited.<sup>6</sup> For the trial, we calculated that a sample of 130 mother-infant pairs per group would give 90% power for a 15% difference at 6 months in the prevalence of exclusive breastfeeding to be detected at the 5% significance level (two-sided comparison), with the assumption that the proportion of women exclusively breastfeeding in the non-visited group would be 5%. To allow for possible losses, a target of at least 175 per group was set.

All recording forms were precoded and checked daily for completeness and consistency. Double data entry was verified by use of Epi-Info version 6.04. Statistical analyses were by intention to treat. The patterns over time (days 10–180) of the proportions breastfeeding were compared between groups by use of randomisation tests applied to the sum of the log odds-ratios at each timepoint.<sup>12</sup> The test statistics were calculated with the Gauss Computer Package (version 3.2.38).  $\chi^2$  tests were used for proportions (except where indicated) with the Statistical Package for the Social Sciences (version 8.0).

### Role of the funding source

The sponsor of the study had no role in study design; collection, analysis, or interpretation of data; or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit the paper for publication.

### Results

In the preintervention study, 364 mother-infant pairs were recruited and 46 (13%) were lost to follow-up at 6 months (figure 1). In the trial, 350 mother-infant pairs were recruited and 20 (6%) were lost to follow-up (one sudden infant death; one congenital malformation diagnosed after recruitment; and 18 moved from the area, 13 in the non-visited group and five in the visited group). In both the preintervention study and the trial, the mother-infant pairs lost did not differ from those who remained for any of the variables studied.

Variable	Group	
	Home visits (n=175)	No home visits (n=175)
<b>Family income per head*</b>		
<0.5 minimum wage	107 (61%)	102 (58%)
≥0.5 minimum wage	68 (39%)	73 (42%)
<b>Waste collection</b>		
Yes	125 (71%)	129 (74%)
No	50 (29%)	46 (26%)
<b>Toilet</b>		
Flush	118 (67%)	117 (67%)
None/latrine	57 (33%)	58 (33%)
<b>Water piped in house</b>		
Yes	158 (90%)	154 (88%)
No	17 (10%)	21 (12%)
<b>Maternal age</b>		
Younger than 20 years	52 (30%)	64 (37%)
20 years or older	123 (70%)	111 (63%)
<b>Mother literate</b>		
Yes	132 (75%)	131 (75%)
No	43 (25%)	44 (25%)
<b>Antenatal care</b>		
Yes	162 (93%)	167 (95%)
No	13 (7%)	8 (5%)
<b>Parity</b>		
One	64 (37%)	70 (40%)
Two or more	111 (63%)	105 (60%)
<b>Birthweight</b>		
Low (<2500g)	7 (4%)	9 (5%)
<b>Delivery</b>		
Vaginal	123 (70%)	127 (73%)
Caesarean	52 (30%)	48 (27%)

\*Equivalent to US\$40 per month.

**Table 1: Characteristics of the study population (with and without home visits)**

In both the preintervention cohort and the trial, more than half the families had incomes below the poverty line of 0.5 minimum salaries per person per month (equivalent to US\$60 preintervention and \$40 at the trial). Many were living in environments with no indoor toilet (preintervention 42%; trial 33%) or waste disposal (preintervention 32%; trial 27%). The proportion of adolescent mothers was similar in the two parts of the study (preintervention 36%; trial 33%), and for many women the baby was their first (preintervention 37%; trial 38%). Most mothers had received at least some antenatal care (preintervention 82%, trial 94%). Few of the trial infants were of low birthweight (4.6%). In the trial cohort, the two randomised groups were similar in terms of socioeconomic, demographic, and environmental variables and gestational age at birth, birthweight, and mode of delivery of the infant (table 1), and in breastfeeding support provided by hospital staff. As elsewhere in Brazil, rates of caesarean delivery were high (preintervention 18%; trial 29%).

Of the four home visits planned for the first month, 99.6% were completed. Of the six subsequent planned visits, on average five (82.6%) were completed.

Hospital practices in 1998 (before the intervention) were poor in terms of promotion and support of

Activity	1998 (n=364)	2001 (n=349)	p
Step 4			
Skin-to-skin contact in delivery room	94 (26%)	131 (38%)	<0.0001
Helped to breastfeed in delivery room	21 (6%)	22 (6%)	0.89
Step 5			
Shown how to breastfeed (positioning and attachment)	35 (10%)	80 (23%)	<0.0001
Step 6			
Infant given only breastmilk	77 (21%)	244 (70%)	<0.0001
Given no water/tea	102 (28%)	280 (80%)	<0.0001
Given no other milk	360 (99%)	345 (99%)	1.00*
Step 7			
Roomed-in	High	307 (88%)	
Step 8			
Advised to breastfeed on demand	NA	41 (12%)	..
Step 9			
Advised not to give pacifiers	NA	260 (75%)	..
Advised not to give bottles	NA	102 (29%)	..

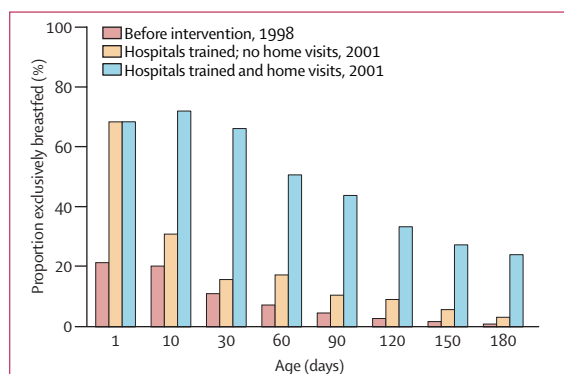
Data for 1998 are from Marques and colleagues. \* NA=data not available. \* Fisher's exact test.

**Table 2: Comparison of activities in the maternity wards to promote and support breastfeeding in 1998 (before intervention) and 2001 (after training), according to mothers**

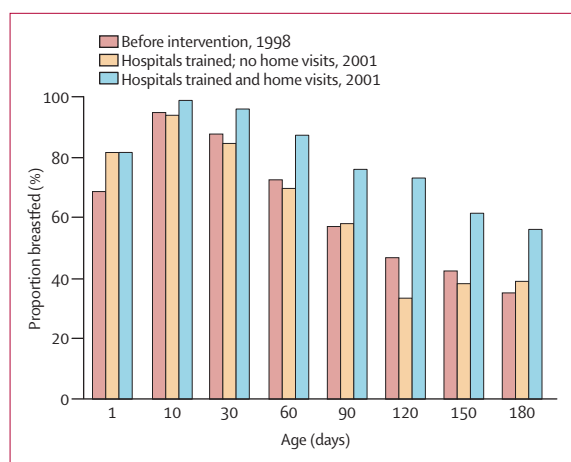
exclusive breastfeeding (table 2). In 2001 (after training), most practices had improved but delivery-room practices remained poor, and neither hospital attained baby-friendly status. Nevertheless, 70% of infants were exclusively breastfed in hospital compared with 21% in 1998 ( $p<0.0001$ ).

Although the hospital-training intervention was associated with a significant increase in the proportion of infants exclusively breastfed in the maternity hospitals, the practice was not sustained and at 10 days of age only 53 (30%) of the 175 infants were exclusively breastfed (figure 2). By 30 days of age, the proportion had fallen to 26 (15%) of 168. When the patterns of exclusive breastfeeding in the two trial groups were compared for days 10–180, they differed significantly ( $p<0.0001$ ), with a mean aggregated prevalence of 45% among the group assigned home visits compared with 13% for the group assigned none. The mean aggregated prevalence before the intervention was 7%. The difference in patterns for days 10–180 between the trial group assigned the hospital-training intervention but no home visits and the preintervention cohort was small but significant ( $p=0.0002$ ).

The hospital-training intervention was associated with a significant increase in the proportion of infants



**Figure 2: Proportions of infants exclusively breastfed from birth to 6 months when born in untrained hospitals (Before intervention, 1998) and after training (2001), with and without home visits**



**Figure 3:** Proportions of infants breastfed at least partially from birth to 6 months when born in untrained hospitals (Before intervention, 1998) and after training (2001), with and without home visits

breastfed at least partially in the maternity hospital (81% vs 70% before the intervention,  $p=0.009$ ; figure 3) but the improvement was not sustained. The pattern of breastfeeding in the two trial groups for days 10–180 differed significantly ( $p<0.0001$ ); the mean aggregated prevalence was 78% among the group assigned home visits compared with 62% for the group assigned none. When compared with the preintervention pattern, the hospital-training intervention was not associated with a significant difference ( $p=0.31$ ), the mean aggregated prevalence before the intervention being 63%.

We investigated whether the hospital-training intervention, or hospital training plus home visits, had similar effects on rates of exclusive breastfeeding at 30 days among families below or above the poverty line and according to maternal educational attainment. After the hospital-training intervention, the proportions of better-off mothers ( $p=0.02$ ) and better-educated mothers ( $p=0.01$ ) who breastfed exclusively at 30 days were significantly higher than those of poorer or less-educated mothers. Thus, there was substantial inequity in exclusive breastfeeding. Among the group assigned home visits, however, all socioeconomic groups

benefited and no inequity of effect of the intervention was found.

Significantly fewer infants in the group assigned home visits than in the group assigned none were fed water, tea, or other milks in the first 6 months or were given bottles or pacifiers (table 3). In the home-visited group, infants not exclusively breastfed were mainly given water, milk, or both, whereas infants in the group not assigned home visits were all commonly given water, tea, and milk from an early age.

## Discussion

The BFHI is the most widely promoted international programme to increase rates of exclusive breastfeeding and to extend breastfeeding duration. There are more than 18 000 baby-friendly hospitals worldwide, and Brazil has 289, more than any other country. The BFHI is based on *Ten Steps to Successful Breastfeeding*,<sup>11</sup> and the evidence of effectiveness for each of the ten steps has been documented.<sup>13,14</sup> Although the maternity hospitals in our study did not attain baby-friendly certification, the BFHI training programme was used and was associated with a striking improvement in exclusive breastfeeding in hospital, with 70% of infants exclusively breastfed compared with 21% previously. The significant effect of the BFHI on rates of exclusive breastfeeding while in hospital is well documented, but there have been few studies to test whether the benefit is sustained at home. We found that the high rates achieved in hospital are very short-lived. Within 10 days, only 30% of infants were exclusively breastfed, and at 1 month the proportion was 15%.

Braun and colleagues<sup>15</sup> found in Porto Alegre in southern Brazil that after BFHI implementation, exclusive breastfeeding rates in the first 6 months of life remained low; they concluded that the BFHI is insufficient to maintain the high rates achieved in hospital. In Italy, high rates of exclusive breastfeeding were achieved in eight hospitals after staff were trained, but again the benefit was not sustained.<sup>16</sup> By contrast, the PROBIT randomised trial in Belarus of a training programme modelled on the BFHI found that 43% of infants were exclusively breastfed at 3 months compared

Day	Sample responding		Water		Tea		Milk		Pacifier		Bottle	
	No visits (n=175)	Visits (n=175)	No visits	Visits*	No visits	Visits*	No visits	Visits*	No visits	Visits*	No visits	Visits*
10	175	174	89 (51%)	21 (12%)	98 (56%)	29 (17%)	55 (31%)	19 (11%)	115 (66%)	61 (35%)	136 (78%)	59 (34%)
30	168	174	115 (69%)	42 (24%)	83 (49%)	26 (15%)	92 (55%)	39 (22%)	120 (71%)	76 (44%)	140 (83%)	66 (38%)
60	167	171	128 (77%)	63 (37%)	61 (37%)	18 (11%)	118 (71%)	69 (40%)	122 (73%)	84 (49%)	141 (84%)	90 (53%)
90	166	167	138 (83%)	73 (44%)	42 (25%)	10 (6%)	125 (75%)	79 (47%)	125 (75%)	81 (49%)	150 (90%)	90 (54%)
120	164	166	133 (81%)	84 (51%)	36 (22%)	10 (6%)	132 (81%)	90 (54%)	121 (74%)	88 (53%)	148 (90%)	101 (61%)
150	160	166	130 (81%)	95 (57%)	24 (15%)	17 (10%)	137 (86%)	100 (60%)	113 (71%)	88 (53%)	144 (90%)	111 (67%)
180	161	169	134 (83%)	91 (54%)	21 (13%)	8 (5%)	139 (86%)	109 (65%)	116 (72%)	90 (53%)	145 (90%)	110 (65%)

\*Proportion significantly lower among the group assigned home visits than in the group assigned no visits;  $\chi^2$   $p<0.0001$  at each timepoint except 150 days ( $p=0.259$ ) and 180 days ( $p=0.013$ ) for proportions given tea, and 120 days ( $p=0.0001$ ), 150 days ( $p=0.0016$ ), and 180 days ( $p=0.0006$ ) for the proportions using pacifiers.

**Table 3:** Comparison of the proportions given water, tea, or other milk and using pacifier or bottle among infants born in hospitals in 2001 after training, with and without home visits



with 6% of infants in control sites ( $p < 0.001$ ).<sup>17</sup> Unlike most other countries, mothers in Belarus normally stay in hospital for 6–7 days postpartum and have about 3 years' obligatory maternity leave. Also for that trial, polyclinic staff were trained to provide postnatal support, and infants were seen routinely every month. Thus there was more than customary opportunity to establish successful lactation in hospital and for continuing postnatal support, and the quality and frequency of support might have differed little from that provided by home-based strategies. In our study setting, mothers stayed in hospital only 24–36 h or 48 h after caesarean deliveries. These short stays are typical of Latin America and countries where under-funded health systems struggle to meet demand, and thus the study has external validity. Early discharge precludes extended individual contact and support and might have contributed to the limited influence of the hospital-training intervention and the stronger effect of the home visits. Home support is likely to be especially important in countries where mothers stay in hospital for a short time.

In our randomised trial, postnatal visits helped to sustain the higher rates of exclusive breastfeeding associated with the hospital-based training programme. The strengths of the study are the randomisation of the home-visiting intervention and the prospective follow-up, which avoided recall bias. One possible limitation is that there were still shortfalls in helping mothers to breastfeed immediately after delivery. Although there was low adherence with advising breastfeeding on demand and not to give bottles, staff might believe that specific advice to breastfeed on demand is unnecessary in a population where this practice is the norm and might prefer to focus on advice not to give other liquids rather than specifically advising against bottles. One hospital was much more supportive than the other and was approaching baby-friendly certification, but the rate of exclusive breastfeeding from birth to 6 months was no higher among mothers who delivered in that hospital than among those who gave birth in the less supportive one (14% vs 12% at 6 months, both groups combined,  $p = 0.73$ ). This similarity is consistent with our finding that home support is more influential than support at the hospital. A further possible limitation is reporting bias. We tried to keep this bias to a minimum by using fieldworkers who were unconnected with the delivery of the interventions and who were unaware of group allocation, and by collecting the monthly data before the home support visits. Mothers and fieldworkers were unaware of the study hypotheses, and other data (eg, morbidity and growth) were collected in addition so that the focus was not solely on infant feeding.

Others<sup>18–21</sup> in diverse settings have also shown in randomised trials that postnatal home visits are effective in increasing the proportion of exclusive breastfeeding. The challenge now is how to incorporate home visits, or some other effective means of postnatal support, into

routine health-service delivery. In India, promotion of exclusive breastfeeding has been successfully integrated into existing primary health-care services by use of traditional birth attendants, village-based workers, auxiliary nurse midwives, and other health-care providers.<sup>21</sup> In Brazil, the programme of community health agents is an option; in Recife, we are working in six city districts with the Municipal Health Secretariat to train more than 1400 community health agents, as well as maternity staff and doctors in 17 clinics. Training started in August, 2003, and is planned to end in December, 2005. Baseline breastfeeding data have been collected and the effects will be assessed. In our study in Palmares, four visits were made in the first month and the feasibility of such frequent visits can be questioned. In the scaled-up programme, this number has been reduced to two, giving a total of eight visits. This frequency is proving feasible, and preliminary results suggest that rates of exclusive breastfeeding in the scaled-up programme are similar to those in Palmares with ten visits. In Bangladesh, peer counsellors visited at least 15 times, before and after the infant was born, and 70% of visited infants were exclusively breastfed at 5 months compared with 6% of control infants.<sup>18</sup> In Mexico, four postnatal visits were more effective than two postnatal visits.<sup>19</sup> Further research is warranted to identify the minimum number of visits, and their timing, for programme effectiveness.

In terms of child survival, there is evidence, at least in Brazil,<sup>15</sup> that the BFHI has limited influence as a strategy for achieving high rates of exclusive breastfeeding. Our findings add a further dimension to this concern because the hospital-training intervention was associated with inequity;<sup>4</sup> it benefited the more affluent rather than the most disadvantaged. By contrast, home visits benefited all socioeconomic groups. We believe there is an urgent need to question reliance on the BFHI for breastfeeding promotion, especially in countries like Brazil where the postpartum hospital stay is short and there are strong traditions of giving water and tea from birth, and for early introduction of other milks and pacifiers.<sup>6</sup> In the *Ten Steps to Successful Breastfeeding*, step 10 requires the establishment of support groups and is commonly the least emphasised.<sup>16,22</sup> Moreover, Baby-Friendly certification can be awarded even if only rudimentary postnatal support is offered. Thus, although the BFHI was conceived as a hospital-based initiative with postnatal support, in practice the hospital component customarily stands alone.

In conclusion, we believe there could be a misplaced sense of security among international agencies and governments that the BFHI will sustain improved breastfeeding practices when mothers return home. Our results add weight to previous evidence that improvements are largely confined to the maternity hospital and are not sustained, and that a combination of systems (in the hospital and in the community) is

needed so that mothers can receive continuing help locally, especially in the early weeks after the infant's birth, when difficulties commonly arise. If the millennium development goal for reduction in child mortality is to be reached, delivery strategies for breastfeeding promotion, particularly reliance on the BFHI, need to be re-examined.

#### Contributors

All authors helped to conceive the research and design the study, analyse the results, and write the paper. S Bechara Coutinho trained the maternity staff and home visitors. P I Cabral de Lira and M de Carvalho Lima trained the fieldworkers and were responsible for project management and maintaining data quality.

#### Conflict of interest statement

We declare that we have no conflict of interest.

#### Acknowledgments

We thank the research team, hospital staff, home visitors, and mothers for their cooperation; the Paediatric Society of Pernambuco for their interest and administrative support; and Mike Kenward for the randomised-based statistical tests. The British Council facilitated interinstitutional collaboration, which we greatly appreciate. The study was funded by the Superintendência para o Desenvolvimento do Nordeste (SUDENE), Brasil (Agency for the Development of the Northeast, Brazil).

#### References

- Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003; **361**: 2226–34.
- Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, and the Bellagio Child Survival Study Group. How many child deaths can we prevent this year? *Lancet* 2003; **362**: 65–71.
- Bryce J, el Arifeen S, Pariyo G, Lanata CF, Gwatkin D, Habicht J-P, and the Multi-Country Evaluation of the IMCI Study Group. Reducing child mortality: can public health deliver? *Lancet* 2003; **362**: 159–64.
- Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht J-P. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet* 2003; **362**: 233–41.
- The Bellagio Study Group on Child Survival. Knowledge into action for child survival. *Lancet* 2003; **362**: 323–27.
- Marques NM, Lira PIC, Lima MC, et al. Breastfeeding and early weaning practices in Northeast Brazil: a longitudinal study. *Pediatrics* 2001; **108**: e66.
- WHO. Indicators for assessing breastfeeding practices. Geneva: WHO, 1992.
- UNICEF/WHO. Manejo e promoção do aleitamento materno num Hospital Amigo da Criança: Curso de 18 horas para equipes de maternidades. Brasília: UNICEF, 1993.
- UNICEF/WHO. Aconselhamento em amamentação: um curso de treinamento. Brasília: UNICEF, 1997.
- Savage King S. Como ajudar as mães a amamentar. Londrina: Universidade Estadual de Londrina, 1997.
- WHO. Ten steps to successful breastfeeding. Geneva: WHO, 1998.
- Good P. Permutation tests. Berlin: Springer-Verlag, 1993.
- WHO. Evidence for the ten steps to successful breastfeeding. Geneva: WHO, 1998.
- Pérez-Escamilla R, Pollitt E, Lönnerdal B, Dewey KG. Infant feeding policies in maternity wards and their effect on breastfeeding success: an analytical overview. *Am J Public Health* 1994; **84**: 89–97.
- Braun MLG, Giugliani ERJ, Soares MEM, Giugliani C, de Oliveira AP, Danelon CMM. Evaluation of the impact of the Baby-Friendly Hospital Initiative on rates of breastfeeding. *Am J Public Health* 2003; **93**: 1277–79.
- Cattaneo A, Buzzetti R. Effect on rates of breast feeding of training for the Baby Friendly Hospital Initiative. *BMJ* 2001; **323**: 1358–62.
- Kramer M, Chalmers B, Hodnett E, et al. Promotion of breastfeeding intervention trial (PROBIT): a randomized trial in the Republic of Belarus. *JAMA* 2001; **285**: 413–20.
- Haider R, Ashworth A, Kabir I, Huttly SR. Effect of community-based peer counsellors on exclusive breastfeeding practices in Dhaka, Bangladesh: a randomised controlled trial. *Lancet* 2000; **356**: 1643–47.
- Morrow AL, Guerrero ML, Shults J, et al. Efficacy of home-based peer counselling to promote exclusive breastfeeding: a randomised controlled trial. *Lancet* 1999; **353**: 1226–31.
- Leite AJM, Puccini R, Atallah A, et al. Impact on breastfeeding practices promoted by lay counsellors: a randomized and controlled clinical trial. *Clin Epidemiol* 1998; **51** (suppl): 10S.
- Bhandari N, Bahl R, Mazumdar S, et al. Effect of community-based promotion of exclusive breastfeeding on diarrhoeal illness and growth: a cluster-randomised controlled trial. *Lancet* 2003; **361**: 1418–23.
- Westphal MF, Taddei JAC, Venancio SI, Bogus CM. Breast-feeding training for health professionals and resultant institutional changes. *Bull World Health Organ* 1995; **73**: 461–68.