

# Antenatal education and postnatal support strategies for improving rates of exclusive breast feeding: randomised controlled trial

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BMJ 2007;335:596-9  
doi:10.1136/bmj.39279.656343.55

## ABSTRACT

**Objective** To investigate whether antenatal breast feeding education alone or postnatal lactation support alone improves rates of exclusive breast feeding compared with routine hospital care.

**Design** Randomised controlled trial.

**Setting** A tertiary hospital in Singapore.

**Participants** 450 women with uncomplicated pregnancies.

**Main outcome measures** Primary outcomes were rates of exclusive breast feeding at discharge from hospital and two weeks, six weeks, three months, and six months after delivery. Secondary outcomes were rates of any breast feeding.

**Results** Compared with women who received routine care, women in the postnatal support group were more likely to breastfeed exclusively at two weeks (relative risk 1.82, 95% confidence interval 1.14 to 2.90), six weeks (1.85, 1.11 to 3.09), three months (1.87, 1.03 to 3.41), and six months (2.12, 1.03 to 4.37) postnatally. Women receiving antenatal education were more likely to breast feed exclusively at six weeks (1.73, 1.04 to 2.90), three months (1.92, 1.07 to 3.48), and six months (2.16, 1.05 to 4.43) postnatally. The numbers needed to treat to achieve one woman exclusively breast feeding at six months were 11 (6 to 80) for postnatal support and 10 (6 to 60) for antenatal education. Women who received postnatal support were more likely to exclusively or predominantly breast feed two weeks after delivery compared with women who received antenatal education (1.53, 1.01 to 2.31). The rate of any breastfeeding six weeks after delivery was also higher in the postnatal support group compared with women who received routine care (1.16, 1.02 to 1.31).

**Conclusions** Antenatal breast feeding education and postnatal lactation support, as single interventions based in hospital both significantly improve rates of exclusive breast feeding up to six months after delivery. Postnatal support was marginally more effective than antenatal education.

**Trial registration** Clinical Trials NCT00270920.

## INTRODUCTION

Despite awareness of the many advantages of breast feeding, its rates often fall short of recommended

practice. The World Health Organization<sup>1</sup> and the American Academy of Pediatrics<sup>2</sup> advocate exclusive breast feeding for six months and partial breast feeding thereafter for at least 12 or 24 months. Evidence of effective interventions to improve exclusive breast feeding for the recommended duration of six months is sparse. While there is evidence for the effectiveness of professional support in prolonging duration of breast feeding and increasing rates of initiation of breast feeding, the strength of its effect on the rate of exclusive breastfeeding is unclear.<sup>3,4</sup>

We used a randomised controlled study to compare the relative effectiveness of an antenatal breast feeding education protocol and a postnatal lactation support protocol versus routine care in improving rates of exclusive breast feeding in a tertiary hospital setting.

## METHODS

### Study population

We recruited healthy pregnant women who were attending antenatal clinics at the National University Hospital, a tertiary hospital in Singapore. Mothers were eligible for participation if they were more than 34 weeks' gestation at the time of delivery, expressed an intention to breast feed, and had no illness that would contraindicate breast feeding or severely compromise its success.

### Assignment and intervention

Women were randomised into three groups. Group 1 was the control group and women received routine antenatal, intrapartum, and postnatal obstetric care with no special intervention applied. Women randomised to group 2 received one session of antenatal breastfeeding education in which they were shown a 16 minute educational video, which introduced the benefits of breastfeeding, demonstrated correct positioning, latch on, and breast care, and discussed common concerns. They were also given printed guides on breast feeding<sup>5,6</sup> and an opportunity to talk to a lactation counsellor for about 15 minutes. They subsequently received routine intrapartum and postnatal obstetric care.

### Definitions of types of breastfeeding

Exclusive breast feeding—only breast milk given to baby. Medicines, vitamins, and oral rehydration solution may be given but no formula or water

Predominant breast feeding—breast milk and water, sweetened water, and juices given without formula

Partial breast feeding—breast milk and complementary food such as formula milk, gruel, semisolids, or solids are given

No breast feeding—no breast milk given and only formula milk and other liquids or food given

Women randomised to group 3 were placed in a two session postnatal lactation support programme. They were visited by a lactation consultant within the first three postnatal days before discharge from hospital. They also received the same printed guides on breast feeding<sup>56</sup> during this visit. A second support session was provided during their first routine postnatal visit one to two weeks after delivery. During these two encounters, the women received hands-on instructions in latching on, proper positioning, and other techniques to avoid common complications. Each encounter lasted about 30 minutes.

### Outcome measures

The primary outcomes were rates of exclusive breast feeding at discharge from the hospital and at two weeks, six weeks, three months, and six months after delivery. Secondary outcomes were the frequencies of any breast feeding at each of these intervals (box).

### RESULTS

We recruited 450 women from February 2004 to September 2005, of whom 151 were randomised to receive standard hospital care (group 1), 150 to antenatal education (group 2), and 149 to postnatal lactation support (group 3). In total, 367 (82%) completed six months of follow-up, with a similar number lost to follow-up in the three study groups. Characteristics among the three randomised groups were similar (see [bmj.com](http://bmj.com)).

### Effect of intervention

Compared with the control group, women randomised to postnatal intervention were significantly more likely

to breast feed exclusively from two weeks till six months after delivery (table 1). At two weeks, 38% (48/128) of women randomised to postnatal intervention were exclusively breast feeding compared with 21% (28/136) of women who received routine hospital care (relative risk 1.82; 95% confidence interval 1.14 to 2.90; number needed to treat=6, 4 to 17). This significant improvement was still present six weeks, three months, and six months after delivery. At six months, 19% (22/119) of women in the postnatal intervention group were exclusively breastfeeding compared with 9% (11/126) of the women in the control group (2.12; 1.03 to 4.37). For every 11 women who received postnatal lactation support, one exclusively breast fed for six months (number needed to treat=11, 6 to 80).

Women randomised to antenatal education were more likely to exclusively breast feed compared with the control group only from six weeks postnatally, when 29% (39/133) of women in the antenatal education group were exclusively breastfeeding compared with 17% (23/136) of women receiving routine care (1.73, 1.04 to 2.90; number needed to treat=8, 5 to 41). This significant benefit was also evident at three months and six months after delivery (table 1). At six months, 19% (23/122) of women randomised to receiving antenatal education were exclusively breastfeeding compared with 9% (11/126) of women in the control group (2.16; 1.05 to 4.43). One woman exclusively breast fed for six months for every 10 women who received antenatal breastfeeding education (number needed to treat=10, 6 to 60).

We compared the efficacy of antenatal education and postnatal support with regard to breast feeding and found no significant difference in improvements in the rate of exclusive breast feeding (table 1).

The incidence of any breast feeding was higher in women who received postnatal lactation support than in women in the control group (1.19, 1.05 to 1.36; number needed to treat=8, 5 to 26) at six weeks after delivery (table 2). They were also more likely to breast feed at six weeks compared with women who received antenatal education (1.16, 1.02 to 1.31; number

**Table 1 | Number (percentage) of women exclusively breast feeding by group allocation\***

	Group 1	Group 2	Group 3	Relative risk (95% CI); number needed to treat (NNT) (95% CI)		
				Group 2 v group 1	Group 3 v group 1	Group 3 v group 2
At discharge from hospital	25/138 (18)	27/138 (20)	36/134 (27)	1.08 (0.63 to 1.86), P=0.782	1.48 (0.89 to 2.47), P=0.130	1.37 (0.83 to 2.26), P=0.213
At 2 weeks	28/136 (21)	36/133 (27)	48/128 (38)	1.32 (0.80 to 2.15), P=0.278	1.82 (1.14 to 2.90), P=0.012; NNT=6 (4 to 17)	1.39 (0.90 to 2.13), P=0.139
At 6 weeks	23/136 (17)	39/133 (29)	40/128 (31)	1.73 (1.04 to 2.90), P=0.036; NNT=8 (5 to 41)	1.85 (1.11 to 3.09), P=0.019; NNT=7 (4 to 24)	1.07 (0.69 to 1.66), P=0.777
At 3 months	17/134 (13)	31/127 (24)	29/122 (24)	1.92 (1.07 to 3.48), P=0.030; NNT=9 (5 to 43)	1.87 (1.03 to 3.41), P=0.040; NNT=9 (5 to 60)	0.97 (0.59 to 1.62), P=0.918
At 6 months	11/126 (9)	23/122 (19)	22/119 (19)	2.16 (1.05 to 4.43), P=0.036; NNT=10 (6 to 60)	2.12 (1.03 to 4.37), P=0.042; NNT=11 (6 to 80)	0.98 (0.55 to 1.76), P=0.948

\*Group 1=standard hospital care; group 2=antenatal breastfeeding education; group 3=postnatal lactation support. Based on completed follow-up.

**Table 2 | Number (percentage) of women breastfeeding at all by group allocation\***

	Group 1	Group 2	Group 3	Relative risk (95% CI); number needed to treat (NNT) (95% CI)		
				Group 2 v group 1	Group 3 v group 1	Group 3 v Group 2
At discharge from hospital	131/138 (95)	132/138 (96)	131/134 (98)	1.01 (0.79 to 1.28), P=0.951	1.03 (0.81 to 1.31), P=0.812	1.02 (0.80 to 1.30), P=0.860
At 2 weeks	127/136 (93)	126/133 (95)	126/128 (98)	1.02 (0.79 to 1.20), P=0.909	1.05 (0.82 to 1.35), P=0.675	1.04 (0.81 to 1.33), P=0.761
At 6 weeks	96/136 (71)	97/133 (73)	108/128 (84)	1.03 (0.89 to 1.20), P=0.669	1.19 (1.05 to 1.36), P=0.008; NNT=8 (5 to 26)	1.16 (1.02 to 1.31), P=0.024; NNT=9 (5 to 60)
At 3 months	65/134 (49)	73/127 (58)	71/122 (58)	1.19 (0.85 to 1.66), P=0.320	1.20 (0.86 to 1.68), P=0.289	1.01 (0.73 to 1.40), P=0.941
At 6 months	43/126 (34)	52/122 (43)	48/119 (40)	1.25 (0.83 to 1.87), P=0.281	1.18 (0.78 to 1.78), P=0.426	0.95 (0.64 to 1.40), P=0.783

\*Group 1=standard hospital care; group 2=antenatal breastfeeding education; group 3=postnatal lactation support. Based on completed follow-up.

needed to treat=9, 5 to 60). There was no significant difference among the three groups at discharge from hospital, two weeks, three months, and six months after delivery.

## DISCUSSION

Antenatal breastfeeding education and postnatal lactation support both significantly improved the rates of exclusive breastfeeding up to six months after delivery compared with routine care in a tertiary hospital setting. While both strategies were effective, postnatal support was marginally more effective than antenatal education in improving breastfeeding practice.

The protective effects of breast feeding have been shown to be dose responsive<sup>7-9</sup> and minimal breast feeding may not be protective.<sup>8</sup> Researchers in lactation have advocated that research on promotion of breast feeding must target exclusive breast feeding,<sup>10</sup> and ours is one of the larger randomised controlled trials with this primary outcome.

Most of the women in our study did not attend the optional antenatal classes offered by the hospital. Our results may not apply to settings where advice on breast feeding or attendance at antenatal classes is part of standard hospital care. The rates of any and exclusive breastfeeding in our control population (group 1) were relatively low at only 34% and 9%, respectively, six months after delivery. Our findings may not be applicable in settings where the baseline breastfeeding practice is better. Statistics from the Infant Feeding 2000 survey, however, suggest that rates of breast feeding in the UK<sup>11</sup> are similar to those of Singapore.<sup>12</sup> Around 90% of the women in our study had monthly household incomes of less than Singapore \$5000 (£1630, €2413, \$3294). Thus, generalisation of the results to populations with higher household incomes may not be appropriate. The recent NICE evidence into practice briefing on promotion of initiation and duration of breast feeding,<sup>13</sup> however, recommended that education and support should be targeted at women with low incomes to increase rates of exclusive breast feeding.

Exploration of race or ethnicity would be useful and may help to determine whether specific subpopulations would benefit differentially from the interventions. This would allow better planning and allocation of resources used for promotion of breast feeding. We also did not examine the women's satisfaction with respect to the various interventions.

Although professional lactation support can improve the duration of overall breast feeding, its effect in improving exclusive breast feeding is unclear.<sup>3,9,14</sup> Thus far, studies that report improvement of rates of exclusive breastfeeding have involved mainly community based peer counselling strategies.<sup>15-17</sup> Even then, a randomised trial in the UK recently cast doubt on the efficacy of this approach.<sup>18</sup>

Our findings may be applied in most hospital settings to devise policies regarding strategies to promote breast feeding. Lack of breast feeding is significantly associated with higher use and cost of health care.<sup>19</sup> Improved short and long term health of breastfed children, improved wellbeing of mothers who have breast fed, and the cost of goods consumed are major factors leading to economic benefits from the promotion of breast feeding.<sup>20-23</sup> Future research should compare the specific cost effectiveness of such strategies for improvement of breastfeeding practice.

We thank Su-Yin Lee and the NUH-NUS Medical Publications Support Unit for help in preparing the manuscript.

**Contributors:** See bmj.com.

**Funding:** National Healthcare Group (grant No NHG-RPR 03002).

**Competing interests:** None declared.

**Ethical approval:** Institutional Review Board of the Yong Loo Lin School of Medicine, National University of Singapore.

**Provenance and peer review:** Non-commissioned, externally peer reviewed.

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### WHAT IS ALREADY KNOWN ON THIS TOPIC

Various forms of education on breast feeding are effective but only by increasing rates of initiation of breast feeding

While there is evidence for the effectiveness of professional lactation support in prolonging duration of breast feeding, the strength of its effect on the rate of exclusive breast feeding is unclear

### WHAT THIS STUDY ADDS

Hospital based antenatal education on breast feeding and postnatal lactation support both significantly improve rates of exclusive breast feeding for up to six months after birth

Postnatal lactation support is marginally more effective than antenatal education

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Accepted: 28 June 2007

## Child-parent screening for familial hypercholesterolaemia: screening strategy based on a meta-analysis

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BMJ 2007;335:599-603  
doi:10.1136/bmj.39300.616076.55

This article is an abridged version of a paper that was posted on [bmj.com](http://bmj.com) on 13 September 2007. Cite this version as: *BMJ* 13 September 2007, doi: 10.1136/bmj.39300.616076.55 (abridged text, in print: *BMJ* 2007;335:599-603).

### ABSTRACT

**Objective** To develop a population screening strategy for familial hypercholesterolaemia.

**Design** Meta-analysis of published data on total and low density lipoprotein (LDL) cholesterol in people with and without familial hypercholesterolaemia according to age. Thirteen studies reporting on 1907 cases and 16 221 controls were used in the analysis. Included studies had at least 10 cases and controls with data on the distribution of cholesterol in affected and unaffected individuals.

**Main outcome measures** Detection rates (sensitivity) for specified false positive rates (0.1%, 0.5%, and 1%) in newborns and in age groups 1-9, 10-19, 20-39, 40-59, and ≥60 years.

**Results** Serum cholesterol concentration discriminated best between people with and without familial hypercholesterolaemia at ages 1-9, when the detection

rates with total cholesterol were 88%, 94%, and 96% for false positive rates of 0.1%, 0.5%, and 1%. The results were similar with LDL cholesterol. Screening newborns was much less effective. Once an affected child is identified, measurement of cholesterol would detect about 96% of parents with the disorder, using the simple rule that the parent with the higher serum cholesterol concentration is the affected parent.

**Conclusions** The proposed strategy of screening children and parents for familial hypercholesterolaemia could have considerable impact in preventing the medical consequences of this disorder in two generations simultaneously.

### INTRODUCTION

Familial hypercholesterolaemia is an autosomal dominant disorder affecting about two in every 1000 people.<sup>1</sup> It results in increased serum cholesterol