

## RESEARCH

# Systematic review of peer support for breastfeeding continuation: metaregression analysis of the effect of setting, intensity, and timing

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## Abstract

**Objective** To examine the effect of setting, intensity, and timing of peer support on breast feeding.

**Design** Systematic review and metaregression analysis of randomised controlled trials.

**Data sources** Cochrane Library, Medline, CINAHL, the National Research Register, and British Nursing Index were searched from inception or from 1980 to 2011.

**Review methods** Study selection, data abstraction, and quality assessment were carried out independently and in duplicate. Risk ratios and 95% confidence intervals were calculated for individual studies and pooled. Effects were estimated for studies grouped according to setting (high income countries, low or middle income countries, and the United Kingdom), intensity (<5 and ≥5 planned contacts), and timing of peer support (postnatal period with or without antenatal care), and analysed using metaregression for any and exclusive breast feeding at last study follow-up.

**Results** Peer support interventions had a significantly greater effect on any breast feeding in low or middle income countries ( $P<0.001$ ), reducing the risk of not breast feeding at all by 30% (relative risk 0.70, 95% confidence interval 0.60 to 0.82) compared with a reduction of 7% (0.93, 0.87 to 1.00) in high income countries. Similarly, the risk of non-exclusive breast feeding decreased significantly more in low or middle income countries than in high income countries: 37% (0.63, 0.52 to 0.78) compared with 10% (0.90, 0.85 to 0.97);  $P=0.01$ . No significant effect on breast feeding was observed in UK based studies. Peer support had a greater effect on any breastfeeding rates when given at higher intensity ( $P=0.02$ ) and only delivered in the postnatal period ( $P<0.001$ ), although

no differences were observed of its effect on exclusive breastfeeding rates by intensity or timing.

**Conclusion** Although peer support interventions increase breastfeeding continuation in low or middle income countries, especially exclusive breast feeding, this does not seem to apply in high income countries, particularly the United Kingdom, where breastfeeding support is part of routine postnatal healthcare. Peer support of low intensity does not seem to be effective. Policy relating to provision of peer support should be based on more specific evidence on setting and any new peer services in high income countries need to undergo concurrent evaluation.

## Introduction

Breast feeding, both exclusively and partially, confers health benefits to infants and mothers. This led to the World Health Organization's recommendation that all babies should be exclusively breast fed for the first six months after birth.<sup>1</sup> Breastfeeding rates are, however, suboptimal in many countries.<sup>2</sup> Overall, 76% of women in the United Kingdom and 74% in the United States reported initiation of breast feeding, but rates are considerably lower in some regions within countries. Although many low and middle income countries<sup>3</sup> have high rates of some degree of breast feeding, exclusive breast feeding even up to four months is often low (50% in Bangladesh and 29% in Pakistan).<sup>2</sup>

A Cochrane systematic review<sup>4</sup> of trials up to 2005 reported that lay support significantly reduced the risk of not breast feeding: not breast feeding at all (at end of studies) by 14% (95% confidence interval 2% to 24%) and not exclusively breast

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Details of search strategy  
Web references w1-w14

feeding by 28% (10% to 43%). The results of the studies for both analyses showed substantially statistically significant heterogeneity, with  $I^2$  values (a measure of the percentage of total variance across studies attributable to the heterogeneity rather than to chance) of 76% and 97%, respectively. In this situation, explanations for the observed differences in effects should be explored as these can provide useful information for generating guidance.

The UK National Institute for Health and Clinical Excellence issued guidance that peer support programmes should be used to increase breast feeding, especially among women with low incomes.<sup>5</sup> However, none of the four UK based randomised controlled trials and the one quasi-randomised trial were able to show significant improvements in any or exclusive breastfeeding rates.<sup>6-10</sup> We hypothesised that differences in effects between studies may result from different levels of routine support for breast feeding in different settings or the intensity or timing of the delivery of the peer support intervention. It is probable that in settings where the routine level of support for breastfeeding mothers is high, more intensive interventions would be required to achieve an effect.

We carried out a systematic review and meta-analyses of the effectiveness of peer support on breast feeding, investigating the effect of setting, intensity, and timing of the intervention on continuation of any and of exclusive breast feeding.

## Methods

Peer support was defined as support offered by women who have received appropriate training and either have themselves breast fed or have the same socioeconomic background, ethnicity, or locality as the women they are supporting. Peer supporters may be voluntary or receive basic remuneration or expenses.

We looked at two outcomes: any breast feeding at the end of the study follow-up and exclusive breast feeding at the end of the study follow-up. We used each paper's definition of exclusive breast feeding, which in most was the definition used by WHO.<sup>1</sup>

## Literature search

We identified potentially relevant citations through a comprehensive electronic search of the following bibliographic databases and resources: British Nursing Index (1994-June 2011), CINAHL (1967-2011), the Cochrane Library, Embase (1974-June 2011), Medline (1948-June 2011), and controlled trials website (see web extra on [bmj.com](http://bmj.com) for search terms). We manually searched the reference lists of retrieved articles.

A form containing inclusion and exclusion criteria was used to select citations and papers. To be included the trials needed to have recruited pregnant or postpartum women, provided the peer support intervention in the antenatal and postnatal period or postnatal period only, had usual care as the comparator, reported any or exclusive breast feeding at least four weeks postpartum, and used randomisation to create the study groups.

No language restrictions were applied. Two reviewers (LI and KJ) obtained and assessed all citations and hard copies of potentially eligible papers for relevance. Uncertainties were resolved in consultation with other reviewers (CM and KSK).

## Data extraction and risk of bias assessment

Two reviewers (LI and KJ) independently extracted data on participants, intervention (including setting, intensity, and timing of peer support) and comparator arms, study design, methods,

and results. Where participants were missing from follow-up we assumed that they had stopped breast feeding, as is standard practice in meta-analyses in this speciality.<sup>4 11</sup> The same two reviewers independently assessed the risk of bias according to the methods in the Cochrane handbook,<sup>12</sup> documenting the quality of random sequence generation and allocation concealment, description of dropouts and withdrawals, blinded outcome assessment, and selective outcome reporting.

## Data synthesis

Where available we used risk ratios, with 95% confidence intervals, or we calculated these from other reported data. Although trials typically discuss the relative proportions of women still breast feeding, we meta-analysed the relative risk of not breast feeding, as it is more likely to be constant across settings where initiation rates vary. Using the relative risk of not breast feeding predicts effective interventions to make a greater absolute impact in settings where more women fail to continue breast feeding than in settings where continued breast feeding is already common, whereas meta-analysis of the relative risk of still breast feeding would predict the opposite pattern, which is less tenable.<sup>13</sup> We avoided odds ratios as they risk being misinterpreted when event rates are high, as with "any" breast feeding in low or middle income countries.<sup>14</sup>

We derived the relative risk of not breast feeding and not exclusively breast feeding at last study follow-up along with 95% confidence intervals and explored both clinical heterogeneity (by qualitatively comparing their characteristics among included studies) and statistical heterogeneity (using  $\chi^2$  tests of heterogeneity and the  $I^2$  statistic to measure heterogeneity<sup>15</sup>). We combined results from included studies for each outcome to give an overall estimate of the treatment effect using random effects models throughout. For cluster trials we computed the design effect from data presented in the reports (intraclass correlation coefficients and cluster adjusted estimates) and adapted the standard errors of the relative risk to make appropriate allowance for clustering.<sup>14</sup> For example, consider one scenario with a high continuation of breast feeding of 50% and another where continuation is less common, such as 20%. If peer support yielded a relative risk of 0.5 for not continuing breast feeding, this would predict that 25% (0.5×50%) more women (a total of 75%) would breast feed in the first scenario and 40% (0.5×80%) more (a total of 60%) in the second. The absolute benefit of the intervention would be largest in the scenario where most improvement could be made. This seems more tenable than the converse obtained by considering a relative risk of 2.0 for continuing breast feeding, which predicts increases in breast feeding of 50% (a total of 100%) in the first scenario compared with a smaller absolute increase of only 20% (a total of 40%) for the second scenario. Where intraclass correlation coefficients were not reported we computed a design effect using the mean intraclass correlation coefficient from the trials in which they were available.

We explored three a priori hypotheses for the differences in the effect of peer support on any and exclusive breast feeding: setting (high income and middle or low income countries<sup>16</sup>), intensity of the peer support intervention (<5 or ≥5 planned contacts); and timing of the support (antenatal and postnatal or postnatal only). For each hypothesis we subgrouped studies according to their characteristics and we used a random effects metaregression model to determine the significance of differences in effect between the subgroups for both outcomes. Owing to the restricted number of trials we entered only one covariate in each analysis. We investigated the effectiveness of peer support in the United Kingdom using meta-analysis only,

not metaregression. This separate analysis was justified given the policy recommendation for peer support in the United Kingdom, against a highly developed routine community postnatal care service. For all analyses we used the *metan* and *metareg* functions in Stata (version 11).

## Results

The search identified 2160 citations, of which 612 duplicates and review articles were excluded. Screening identified 32 potentially relevant citations for which full text articles were obtained and assessed for eligibility. Seventeen were eligible and included in the review,<sup>6 8-10 17-29 30</sup> but only 15 had data that enabled inclusion in the quantitative syntheses. Data in two studies could be included only descriptively in the review (fig 1⇓).<sup>9 17</sup> A large cluster randomised controlled trial reported its results separately for the three study countries,<sup>18</sup> owing to differences in population breastfeeding rates, provision of healthcare, and population characteristics. The data for each country are included as separate studies in the meta-analyses.<sup>18</sup>

### Description of studies

Four studies were based in the United Kingdom, five in the United States,<sup>17 19-22</sup> two in Canada,<sup>23 24</sup> two in Brazil,<sup>25 26</sup> and one each in Mexico,<sup>27</sup> Bangladesh,<sup>28</sup> the Philippines,<sup>29</sup> and sub-Saharan Africa (in Burkina Faso, Uganda, and South Africa)<sup>18</sup> (table 1⇓). The number of planned contacts ranged from one to 10 or more, with five studies categorised as “less intensive” (<5 planned contacts)<sup>6 9 10 21 27</sup> and 12 as “intensive” (≥5 contacts planned). The implementation of the peer support interventions was often poorly reported, with only five trials reporting both the number of contacts received and the proportion of women in the intervention groups who received some peer support.<sup>6 10 21 23 25</sup> Six of the studies reported neither the number of actual contacts received nor the overall uptake of the intervention.<sup>18 24 26-29</sup> Of the 17 studies, nine reported a peer support intervention that spanned the antenatal and postnatal periods, whereas eight reported a postnatal intervention only and were thus in women who had all initiated breast feeding, and one was a postnatal intervention to women with a baby on the neonatal intensive care unit who intended to breast feed.

In all but four of the 17 trials the peer supporters had previously breast fed a baby: in the others<sup>9 21 25 27</sup> this was not specifically stated but is likely to have been the case in those countries where breastfeeding initiation rates are high. Peer supporters were also of similar age,<sup>22</sup> culture,<sup>23</sup> language,<sup>21</sup> ethnicity,<sup>10 24</sup> education, or socioeconomic status,<sup>23 25</sup> or lived in the same locality as the women.<sup>9 18</sup> Some of the peer supporters were paid employees,<sup>10 17 20 21</sup> some received an honorarium<sup>28</sup> or payment per visit,<sup>8 26</sup> and others described the peers as volunteers, without a description of the payment.<sup>9 23 24</sup> Apart from one trial,<sup>21</sup> all trials offered peer support at home, usually in person, although in two trials support was by telephone.<sup>23 24</sup> The training of the peer supporters ranged from two and a half hours plus a handbook<sup>23</sup> up to an eight week course<sup>10</sup> and was unspecified in only two trials.<sup>6 29</sup>

### Risk of bias in included studies

Several studies did not give sufficient information to assess risk of bias in detail (table 2⇓). Sequence generation was generally adequately described, but concealment of the random allocation was less well described. Eight studies reported taking measures to blind those involved in the outcome assessment. Losses to follow-up ranged from 1% to 41% but were generally balanced

across study arms, with only one study having a difference of more than 10% in follow-up rate between study arms,<sup>17</sup> and in most studies characteristics were balanced between arms at baseline. One study did not undertake an intention to treat analysis, with exclusion of those who did not receive the intervention in the analysis.<sup>17</sup>

### Overall effect of peer support on breast feeding

Thirteen of the studies reported the outcome of any breast feeding. Overall, compared with usual care those allocated to peer support had a 15% significantly lower risk of not breast feeding at the last follow-up (relative risk 0.85, 95% confidence interval 0.77 to 0.94), but with significant heterogeneity:  $\chi^2=31.3$  ( $P=0.002$ ),  $I^2=61.7\%$ .

Twelve of the studies reported on exclusive breast feeding. Compared with usual care those allocated to peer support had an 18% significantly lower risk of not breast feeding exclusively at the last follow-up (0.82, 0.76 to 0.88), with significant heterogeneity:  $\chi^2=127$ , ( $P<0.001$ ),  $I^2=89.7\%$

One study<sup>17</sup> reported a significant increase in any breast feeding in the mothers allocated peer support (odds ratio 2.81, 95% confidence interval 1.11 to 7.14), but not exclusive breast feeding (1.30, 0.30 to 6.65). Another study reported no difference in exclusive breast feeding at four months post partum.<sup>9</sup>

### Setting

The relative risk of not breast feeding at last study follow-up in women allocated peer support was 30% lower than usual care in studies from low or middle income countries (relative risk 0.70, 95% confidence interval 0.60 to 0.81), but only 7% lower in studies from high income countries (0.93, 0.87 to 1.00) and specifically only 4% lower in studies from the United Kingdom (0.96, 0.89 to 1.04) (table 3⇓, fig 2⇓). Peer support interventions significantly reduced the risk of not exclusively breast feeding at last study follow-up compared with usual care in both high income countries and low or middle income countries, although the risk reduction of 37% in the setting of low or middle income countries was considerably larger than the 10% observed in high income countries (table 3, fig 3⇓). No significant effect was seen in the UK only trials (0.98, 0.96 to 1.01). This finding was supported by one study.<sup>9</sup> The metaregression analysis showed that these differences in the effectiveness of the peer support intervention between high income countries and low or middle income countries were significant for both the any breastfeeding outcome ( $P<0.001$ ) and the exclusive breastfeeding outcome ( $P=0.01$ ).

### Intensity

Women in the more intensive interventions (≥5 contacts planned) had a significantly lower risk of not breast feeding at last follow-up compared with usual care (0.79, 0.71 to 0.89), whereas the less intensive interventions were not associated with lower rates of not breast feeding (0.99, 0.90 to 1.09) (table 3, fig 4⇓). This difference was significant in the metaregression analyses ( $P=0.02$ ). The impact of the intervention on exclusive breast feeding (fig 5⇓) did not show a relation with intensity, the reductions in risk compared with usual care being similar (20% and 17%) in the two subgroups, and the small difference in the relative risk not being significant ( $P=0.73$ ).

## Timing of support

Combined antenatal and postnatal peer support was not associated with a significant improvement in not breast feeding at last study follow-up (0.94 0.88 to 1.01), whereas postnatal only interventions did significantly reduce not breast feeding (0.75, 0.63 to 0.89). Metaregression showed this difference to be significant ( $P < 0.001$ ). Combined antenatal and postnatal and postnatal only peer support interventions compared with usual care significantly reduced the risk of not exclusively breast feeding by a similar magnitude (table 3, figs 6 and 7).

## Discussion

Our systematic review provides important clarification on the inconsistency of effects observed in trials of peer support for breast feeding in different settings, which is critical for generating guidance. We assessed the evidence from randomised controlled trials that compared breastfeeding continuation in women offered a peer support intervention, according to setting, intensity, and timing compared with usual care. Analyses according to setting clarify that peer support is effective in low or middle income countries and especially for exclusive breast feeding, which is critical in these settings. Our findings indicate, however, that peer support is likely to be ineffective for increasing breastfeeding rates in high income countries, in particular in the United Kingdom. Peer support provided at a low intensity (<5 planned contacts) seems to be ineffective for any breast feeding.

## Comparison with existing literature

This review focused on the effectiveness of peer support on breast feeding, whereas previous reviews have included any lay support.<sup>4 11</sup> Both these reviews reached similar conclusions to our overall findings and expressed caution in interpretation of the analysis of pooled data owing to the low quality of reporting of many of the trials<sup>4</sup> and the heterogeneity identified.<sup>11</sup> Neither review explored possible reasons for the heterogeneity, however, which we have done using prespecified categories of setting, intensity, and timing of support.

Peer support has been defined as “the provision of emotional, appraisal and informational assistance by a created social network member who possesses experiential knowledge of a specific behaviour or stressor and similar characteristics as the target population.”<sup>30</sup> The overlap between the definitions of peer and lay support is considerable and the terms are often used interchangeably. In most cases the peers in our included trials shared the experience of motherhood and previous breast feeding, whereas in other trials language, ethnicity, age, and locality were the criteria for being a peer. Almost all of the trials of lay support were of peers, but a retrospective sensitivity analysis, which included trials of lay support as well as of peer support, did not alter our findings. Other trials have used peers in the provision of a structured educational programme<sup>31</sup> or lay workers in complex interventions in which breast feeding was a minor component,<sup>32 33</sup> which were not included within our definition of peer support.

The lack of effect of peer support on any or exclusive breast feeding in the UK trials and on any breast feeding in high income countries may well be a result of the amount of support for breast feeding provided as part of standard postnatal care. Even in some highly developed countries, such as Canada, little postnatal breastfeeding support is routinely provided by the health service. Most trials reported support for breast feeding in hospital, but many then described usual care, which requires women to specifically initiate contact to obtain support if they

have difficulties with breast feeding. One study in the United States, for example, described the first routine postnatal contact to be at two weeks, after the period when many women give up breast feeding owing to difficulties such as positioning, discomfort, or insufficient milk.<sup>34 35</sup> This was not the case for the trials in the United Kingdom, where home based midwifery support is provided routinely up to at least 10 days postnatally, and health visitors provide routine support after this time.

In the UK trials peer support was generally less intensive, with one trial not reporting this,<sup>8</sup> and, apart from another trial,<sup>9</sup> included antenatal support in addition to postnatal support. Some confounding of setting by intensity of support may exist because three of the five trials of a low intensity intervention were in the United Kingdom and only one in a low to middle income country. We do not know whether more intensive interventions in the United Kingdom might be effective, but they would necessarily be more costly if the peers were paid. Whether peer support targeted at women who have not breast fed before or who have no experience of breast feeding in their social groups might be of benefit is another question to be answered in the United Kingdom and other high income countries.

The effectiveness of peer support in increasing continuation of any and particularly exclusive breast feeding in low or middle income countries is critical. Breast feeding has been associated with significantly reduced deaths from neonatal sepsis<sup>36</sup> and deaths from diarrhoea and acute respiratory tract infections in the first six months of life.<sup>37</sup> Exclusive breast feeding, for which peer support had a substantial effect in low or middle income countries, is associated with a reduction in gastrointestinal infections,<sup>38 39</sup> longer periods of maternal lactational amenorrhoea,<sup>40</sup> and a non-significant reduction in infant growth at six months.<sup>40</sup> Thus peer support should contribute towards the Millennium Development Goal 4 of reducing child mortality in under 5s. To put into context the effectiveness of peer support for increasing exclusive breast feeding in low or middle income countries, we calculated the number needed to treat for an additional woman to be exclusively breast feeding at six months. Assuming a rate of not exclusively breast feeding of 90% in the population, which is similar to that reported in several of the trials included in this review,<sup>18 26 27 29</sup> and a relative risk of 0.63 (fig 3), three women would need to receive peer support for one additional woman to be practising exclusive breast feeding at six months.

That peer support provided in both antenatal and postnatal periods is ineffective at increasing any breast feeding is counterintuitive. This is probably because most trials that span both periods are also aimed at increasing breastfeeding initiation, thus the populations encompass much less motivated women. Those trials of only postnatal support are usually targeted at women who have already initiated breast feeding. In addition this comparison is confounded by setting since most women in low or middle income countries initiate breast feeding.

## Strengths and limitations of the review

This review followed contemporary recommended methods.<sup>12</sup> Searching was systematic and not limited by language of publication. To reduce the potential for confounding we restricted the review to randomised controlled trials.

The trials within this review used a range of definitions of exclusive breast feeding, most following the WHO definition, but others used less robust definitions, such as limitation to the previous week<sup>18 27</sup> or no more than other liquids twice a week,<sup>21</sup> which may affect this outcome. Support for breast feeding provided to the usual care groups was rarely well described,

making it difficult to interpret fully the reasons for differences between trials and countries in the effectiveness of peer support. Although the intended schedule of contact by the peer supporters was usually described, the actual coverage<sup>8 24 26-29</sup> and intensity of support<sup>8 17 19 20 24 26 27 28 29</sup> was often not reported. It is thus hard to determine in some cases whether a lack of effect was due to ineffectiveness or to a low uptake of the intervention. We therefore had to use the planned intensity of support for our analyses. The lack of data on implementation of the interventions is a particular feature of peer support, possibly because of the nature of being a peer and sometimes a volunteer, rather than professionals who are used to recording activity. One trial from the United Kingdom<sup>9</sup> that aimed to increase exclusive breast feeding as a secondary outcome to improving infant nutrition, did not start the peer support until after 10 weeks post partum, which limited the duration of this support. The results of this trial are only presented descriptively but are consistent with the findings of the other UK trials.

The trials set in low or middle income countries were more likely to focus on exclusive breast feeding, as the health gains are likely to be much greater in these settings. However, these countries are also less likely to have highly developed universal healthcare incorporating routine postnatal support and peer support is likely to have its greatest impact when compared with no routine support. It is therefore possible that the greater effect size for exclusive breast feeding is due to confounding by setting.

We used the outcome of “not breastfeeding at last study follow-up,” which was at three to six months for all but two of the trials, where follow-up was shorter. Sensitivity analyses to remove any possible bias that might have occurred as a result of differing follow-up durations were undertaken excluding the trials with shorter follow-up.<sup>21 22</sup> The results remained much the same, except that relative risk of not exclusively breast feeding in not intensive interventions just reached statistical significance (relative risk 0.90, 95% confidence interval 0.83 to 0.98). Selecting the last study follow-up may also fail to show a shorter term effect on breastfeeding rates when the intervention was of short duration.

## Implications for future research or clinical practice

Although overall, peer support interventions seem to be associated with increases in any and exclusive breast feeding, considerable inconsistency exists and seeking explanation for this is critical for public health policy.<sup>41</sup> In low or middle income countries, peer support interventions are effective in increasing continuation of exclusive breast feeding and should be recommended. However, peer support interventions may not be effective where routine services to support breast feeding are already established, as in the United Kingdom or in some other high income countries. Policy relating to provision of peer support needs to be based on more context specific evidence. Alongside implementing such programmes in high income countries we strongly recommend a robust evaluation of outcomes.

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Contributors: KJ, CM, KSK, and LI conceived the study. LI designed the search strategy. LI and KJ selected the papers for inclusion and abstracted the data. CM and KSK resolved differences in inclusion and abstraction. JJD and NF provided advice about the meta-analysis. JJD, KJ, and LI undertook the meta-analyses. KJ, CM, and LI wrote the first

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**What is already known on this topic**

Meta-analyses of lay support for increasing breastfeeding rates suggest an effect on both any and exclusive breast feeding  
These meta-analyses, however, showed considerable heterogeneity, which has not been investigated

**What this study adds**

In low or middle income countries, peer support interventions are effective in increasing continuation of exclusive breast feeding and should be recommended  
Peer support interventions, however, may not be effective where there are routine services already established to support breast feeding, as in the United Kingdom or in some other high income countries  
New peer support services in high income countries need to undergo concurrent evaluation

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## Tables

Table 1 | Characteristics of included studies

Study, country	Study design and methods	Inclusion and exclusion criteria	Intervention	Outcomes	Reported results
Agrasada 2005 <sup>29</sup> Philippines	Randomised controlled trial, 204 participants (intervention 1, n=68; intervention 2, n=67; control n=69) recruited in hospital in postnatal period before discharge home on or before third day after birth	Inclusion criteria: primiparous, aged $\geq 18$ , intending to breast feed, vaginal delivery of live infant at term of low birth weight with Apgar score of $>8$ at five minutes. Exclusion criteria: taking drug that would prevent breast feeding; not staying in study area until infant was 6 months old	Home based peer counselling support: eight visits at days 3-5, 7-10, and 21, and at six weeks, then monthly until 5.5 months. Intervention 1, home based breastfeeding counselling; intervention 2, home based childcare counselling (used as an attention control); control, usual care (no counsellors)	Primary outcome: exclusive breastfeeding prevalence at 2 and 4 weeks and each month until six months. Secondary outcome: duration of breast feeding, infant weight changes, and diarrhoea morbidity	Mothers in intervention 1 were 6.3 times (95% CI 3.53 to 11.3) more likely to exclusively breast feed than other groups. Exclusive breast feeding at six months, intervention 1, 44%; intervention 2, 7%; control 0%. Any breast feeding at six months, intervention 1, 63.2%; control, 29%; $P < 0.001$
Anderson 2005 <sup>19</sup> USA	Randomised controlled trial, 182 participants (intervention n=90, control n=92) recruited from prenatal clinics while pregnant	Inclusion criteria: pregnancy $<32$ weeks, predominantly Hispanic, eligible for Women, Infants, and Children grant, aged $\geq 18$ , considering breast feeding, healthy full term singleton. Exclusion criterion: admission to neonatal intensive care unit	Peer counselling to improve exclusive breastfeeding rates. Intervention, peer counselling: three antenatal home visits, daily hospital visits, and nine postnatal home visits. Control, usual care only: conventional breastfeeding education from antenatal clinic staff, at birth having hands-on assistance with breast feeding from maternity ward staff: if had serious breastfeeding problems then seen by lactation consultant.	Exclusive breastfeeding status at hospital discharge, months 1, 2, and 3. Any breast feeding at three months	Not exclusively breast fed at three months: control 98.6%, intervention 79.4% (relative risk 1.24, 95% CI 1.09 to 1.41). Not breast fed at three months (1.26, 0.93 to 1.70)
Chapman 2004 <sup>20</sup> USA	Randomised controlled trial, 219 participants (intervention n=113, control n=106) recruited from hospital prenatal clinic in antenatal period	Inclusion criteria: predominantly Hispanic women, $<27$ weeks' gestation, qualified for Women, Infants and Children grant, aged $\geq 18$ , available for telephone follow-up, considering breast feeding, living in greater Hartford area, not yet enrolled in peer counselling programme, healthy full term singleton. Exclusion criteria: infants with congenital abnormalities, history of maternal HIV, infants admitted to neonatal unit	Intervention, routine breastfeeding education plus peer counselling: $\geq 1$ antenatal home visit, daily in hospital visits, and $\geq 3$ postnatal home visits. Control, routine breastfeeding education only	Primary outcomes: breastfeeding initiation and rates at months 1, 3, and 6. Exclusive breast feeding at one month	Percentage not breast feeding at one month: intervention 37.5%, control 49.3% (relative risk 0.72, 95% CI 0.50 to 1.05). At three months: intervention 55.6%, control 70.8% (0.78, 0.61 to 1.00). At six months: 0.94 (0.79 to 1.11). Risk of not breast feeding exclusively at one month 1.07 (0.90 to 1.27)
Coutinho 2005 <sup>25</sup> Brazil	Randomised controlled trial, 350 participants (intervention and control, each 175) recruited in postnatal period before discharge home from hospital	Inclusion criteria: healthy singletons, birth weight $>2500$ g, mothers without serious illness	Intervention, 10 home visits starting three days postnatally, four visits in month 1, two-weekly in month 2, then monthly to six months. Control, usual care. Both groups received hospital care in line with baby friendly initiative	Primary outcome: rate of exclusive breast feeding from birth to six months. Any breast feeding	Mean aggregated prevalence of exclusive breast feeding from 10 days to six months: intervention, 78%; control 62%, $P < 0.001$
Dennis 2002 <sup>23</sup> Canada	Randomised controlled trial, 256 participants (intervention n=132, control n=124) recruited in postnatal period before discharge home from hospital	Inclusion criteria: primiparous, initiated breast feeding, aged at least 16, singleton birth at 37 weeks or onwards, had access to telephone	Intervention, telephone based peer support initiated within 48 hours of hospital discharge, schedule to be individualised therefore not prescribed. Control, usual care: conventional postnatal support including in-hospital breast feeding and telephone support line by nursing staff. Support from public health nurses at community health department if needed	Primary outcome: breast feeding within 24 hours preceding telephone interview at week 12	Odds ratio of any breast feeding at four weeks 1.10 (95% CI 1.01 to 2.72), $P = 0.03$ ; eight weeks 1.13 (1.00 to 1.28), $P = 0.05$ ; and 12 weeks, 1.21 (1.04 to 1.41), $P < 0.01$

Table 1 (continued)

Study, country	Study design and methods	Inclusion and exclusion criteria	Intervention	Outcomes	Reported results
Di Meglio 2010 <sup>22</sup> USA	Randomised controlled trial, 78 participants (intervention n=38, control n=40) recruited in hospital within 12-36 or 24-48 hours, depending on mode of birth	Inclusion criteria: infants of $\geq 36$ weeks' gestation, birth weight $>2000$ g, and discharged home with mother. Exclusion criteria: infants admitted to neonatal unit for more than six hours, infants with congenital anomalies	Telephone based peer support. Intervention, seven contacts scheduled at 2, 4, and 7 days after discharge and at 2-5 weeks after discharge. Control, usual care comprising access to paediatric care providers and hospital lactation consultants	Primary outcome: duration of "any breast feeding" measured as age (days) at complete cessation of breast feeding	Duration of any breast feeding at eight weeks (median): intervention 75 days, control 35 days. Hazard ratio of breastfeeding cessation 0.71 (95% CI 0.39 to 1.30); P=0.26
Graffy 2004 <sup>6</sup> UK	Randomised controlled trial, 720 participants (intervention n=363, control n=357) recruited from 32 general practices while pregnant	Inclusion criteria: 28-36 weeks pregnant and considering breast feeding, not breast feeding previous child for $\geq 6$ weeks, English speaking, and not planning on moving from area until at least four months postnatally	Antenatal and postnatal volunteer counselling provided by National Childbirth Trust. Intervention, one antenatal visit and postnatal support offered by telephone, or further home visits if requested, and usual care. Control, usual care (not described)	Primary outcome: prevalence of any breast feeding at six weeks. Secondary outcomes: duration of any breast feeding and exclusive breast feeding at six weeks	Breast feeding at six weeks: intervention 65%, control 63% (relative risk 1.02, 95% CI 0.84 to 1.24); P=0.69. Breast feeding at four months: intervention 46%, control 42% (1.09, 0.86 to 1.39); P=0.33. Breastfeeding duration: intervention 110 days, control 96 days, P=0.445. Exclusive breast feeding at six weeks: intervention 31%, control 26%. (1.20, 0.89 to 1.61)
Haider 1999 <sup>28</sup> Bangladesh	Cluster randomised controlled trial, 40 zones randomly selected within Dhaka city, 20 intervention sites and 20 control sites, 726 participants (intervention n=363, control n=363) recruited during pregnancy by house to house survey	Inclusion criteria: pregnant, aged 16-35, no more than three living children or parity 5, intending to stay in study area for duration of trial and in trial area for at least six months after birth. Exclusion criteria: women with medical problems or eclampsia in previous pregnancy; multiple births, congenital anomalies, admission to intensive care, and birth weight $<1800$ g	Home based peer counselling. Intervention, 10 visits scheduled as two in last trimester of pregnancy, four in first month, then monthly between two and five months after birth. This was changed when women reported wanting more regular visits during months 2 and 5, so visits were then fortnightly during this period. Total visits 15, but additional contacts could be made if required. Control (not described)	Primary outcome: prevalence of exclusive breast feeding at five months. Secondary outcomes: time taken to initiate breast feeding, proportion of mothers who gave pre-lacteal feeds (any fluid or food given before colostrum) after birth	Prevalence of exclusive breast feeding at five months: intervention 70%, control 6% (difference 64%, 95% CI 57% to 71%); P<0.001. Time taken to initiate breastfeeding: intervention, median 1 hour (range 0-49 hours); control 9 (0-95) hours; P<0.001. Initiation in first hour: intervention, 64%; control, 15%. Pre-lacteal feeds: intervention 31%, control 89%; P<0.001
Jolly 2011 <sup>10</sup> UK	Cluster randomised controlled trial, 65 antenatal clinic clusters (intervention n=32, control n=33), 848 participants (intervention n=271, control n=302) recruited from antenatal clinics	Inclusion criteria: pregnant and with general practitioner in Heart of Birmingham Primary Care Trust, a multiethnic deprived area	Intervention, peer support workers within 24-48 hours of discharge home then once more in first week. Support then needs based, either by home visits or by telephone. Control, usual care routinely from hospital midwives then community midwives (about 10 days but no longer than 28 days postnatally) then health visitor	Primary outcome: breastfeeding initiation. Secondary outcome: any breast feeding at 10-14 days, six weeks, and six months	Any breast feeding at six months: intervention 34.3%, control 38.9% (odds ratio for any breast feeding in intervention group 1.06 (95% CI 0.71 to 1.58); P=0.77
Hopkinson 2009 <sup>21</sup> USA	Randomised controlled trial, 522 participants (intervention n=255, control n=267) recruited during hospital stay within 20-48 hours of birth	Inclusion criteria: mothers (Hispanic) with low risk infants having mixed feeding in hospital (aim of trial to move these women to practise exclusive breast feeding), had telephone and access to transport. Exclusion criterion: infant with increased risk of hyperbilirubinaemia (risk factors provided)	Intervention, hospital based breastfeeding clinic visit scheduled 3-7 days after birth. Additional visits or phone calls if deemed necessary by mother and clinic staff. Control, usual care, bedside breastfeeding assistance before discharge. On discharge given telephone number of clinic to request breastfeeding assistance if required. First routine contact with Women, Infants, and Children grant at two weeks	Primary outcome: exclusive breast feeding at one month. Secondary outcomes: amount of formula milk given and incidence of feeding problems	Exclusive breast feeding at one month: intervention 16.8%, control 10.4% (adjusted odds ratio 1.87, 95% CI 1.07 to 3.26)
Leite 2005 <sup>26</sup> Brazil	Randomised controlled trial, 1003 participants (intervention n=503, control n=500) recruited postnatally before discharge home from hospital (by day 5)	Inclusion criteria: unfavourably low birthweight baby, expected discharge home by five days, living in study area and remaining there for follow-up period. Exclusion criteria: multiple pregnancy, lived outside study area or had serious health problems requiring inpatient treatment. Also, newborns with health	Intervention, home based peer support scheduled visits on days 5, 10, 15, 30, 60, 90, and 120 after birth. Control, usual care: women to locate their nearby health service facility if any problems	Primary outcome: method of feeding at four months. Secondary outcome exclusive breast feeding	Breast feeding at four months: intervention 76.3%, control 61.3%; P<0.001. Relative risk of bottle feeding 0.61 (95% CI 0.50 to 0.75). Exclusive breastfeeding: intervention 24.7%, control 19.3%; P=0.044

Table 1 (continued)

Study, country	Study design and methods	Inclusion and exclusion criteria	Intervention	Outcomes	Reported results
		problems requiring some level of intensive care			
Merewood 2006 <sup>17</sup> USA	Randomised controlled trial, 108 participants (intervention n=53, control n=55) recruited within 72 hours of birth in hospital	Inclusion criteria: mothers with otherwise healthy premature infant (26-37 weeks' gestation) receiving care in neonatal unit, English or Spanish speaking, had decided to breast feed. Exclusion criteria: women "incapacitated" by illness or birth complications; infants less than 26 weeks	Intervention, hospital and home based peer support. Initial face to face contact within 72 hours while still in hospital then weekly contact for six weeks. In-hospital: at least 30 minutes. After infant's discharge, peer support contact by telephone unless mother decided to come to hospital to see a counsellor. Control, usual care in hospital using a baby friendly initiative, referral to lactation consultant as required, use of breast pump in hospital and at home, access to three breastfeeding classes a week	Primary outcome: receiving any breast milk at 12 weeks	Any breast milk at 12 weeks (odds ratio 2.81, 95% CI 1.11 to 7.14); P=0.01
Mongeon 1995 <sup>24</sup> Canada	Randomised controlled trial, 200 participants (intervention n=100, control n=100) recruited from antenatal clinics while pregnant	Inclusion criterion: women intending to breast feed and doing so for first time	Intervention, schedule of visits included home visit in last month of pregnancy then weekly telephone calls from peer supporter during first six weeks after birth. After this, telephone calls every other week until five months or child was weaned. Control, usual care from community nurses consisting of home visits in first month after birth. Contact after that initiated by mother	Primary outcomes: proportion of women achieving length of time originally intending to breast feed, and frequency of breastfeeding related difficulties	Proportion of women intending to and actually breast feeding at six months or more: intervention, intended 55%, actual 25%; control, intended 56%, actual 20%. No difference
Morrow, 1999 <sup>27</sup> Mexico	Cluster randomised controlled trial, area mapped into 39 domains; 13 clusters randomly allocated to each of three study arms; 130 participants (intervention 1, n=44; intervention 2, n=52; control, n=34) recruited by door to door census during pregnancy	Inclusion criteria: living in study area and had an ongoing pregnancy with positive outcome. Exclusion criterion: moved out of area before first postnatal visit	Intervention 1, six peer counsellor home visits (mid and late pregnancy and in postnatal weeks 1, 2, 4, and 8), intervention 2, three peer counsellor home visits (one in late pregnancy then in weeks 1 and 2 after birth); control, usual care; those experiencing lactation problems to contact their doctor. No other source of breast friendly counselling available	Primary outcome: exclusive breast feeding. Secondary outcomes: duration of breast feeding, proportion of infants having episode of diarrhoea in first three months. Maternal satisfaction with counselling also reported	Exclusive breast feeding at three months: intervention 1 67%; intervention 2 50%; control 12%; P=0.001. Breastfeeding rates at six months: interventions 1 and 2 combined 87%; control 76%; P=0.90
Muirhead 2006 <sup>8</sup> Scotland, UK	Randomised controlled trial, 225 participants (intervention n=112, control n=113) recruited from general practice at 28 weeks' gestation	Inclusion criteria: women consented and randomised at 28 weeks' gestation	Home based peer support from volunteers. Intervention, at least one antenatal contact (more if requested by women). If still breast feeding on hospital discharge would receive peer support at home. Contact every two days or as often as required (phone or home visit) until day 28. Peers provided further support until 16 weeks. Control, usual care: home visits from community midwives for first 10 days, health visitor after this, breastfeeding support groups and workshops	Primary outcome: breastfeeding duration up to 16 weeks	Breast feeding at six weeks: intervention 31%, control 29% (95% CI of difference -10.0 to 14.0). Breast feeding at 16 weeks: intervention 23%; control 18% (95% CI of difference -5.0 to 16.0)
Tylleskar 2011 <sup>18</sup> Burkina Faso, Uganda, and South Africa	Cluster randomised controlled trial, 82 clusters (Burkina Faso 24, Uganda 24, South Africa 34), 2579 participants (Burkina Faso intervention n=392, control n=369, South Africa intervention n=535, control n=485) recruited at about seven months' gestation	Inclusion criteria: pregnant and intending to breast feed, with no plans to move, recruited at seven months; those with singleton baby with no malformation that could interfere with breast feeding at three weeks post partum remained in trial	Intervention, one antenatal and at least four postnatal home visits: Burkina Faso: at weeks 1, 2, 4, 6, 16, and 20; Uganda and South Africa: weeks 1, 4, 7, and 10. Control, usual care in Burkina Faso and Uganda; help with birth certificates and benefits by peer supporter in South Africa	Primary outcome: exclusive breast feeding at 12 weeks. Secondary outcomes: exclusive breast feeding at 24 weeks and infant diarrhoea	Exclusive breast feeding at three months: Burkina Faso, intervention 77%, control 23%; Uganda, intervention 77%, control 34%; South Africa: intervention 8%, control 4%. Exclusive breastfeeding prevalence ratio at 24 weeks: Burkina Faso 7.53 (95% CI 4.42 to 12.82), Uganda 4.66 (3.35 to 6.49), South Africa 9.83 (1.40 to 69.14)

Table 1 (continued)

Study, country	Study design and methods	Inclusion and exclusion criteria	Intervention	Outcomes	Reported results
Watt 2009 <sup>9</sup> UK	Randomised controlled trial, 312 participants (intervention n=155, control n=157) recruited from baby clinics, with infant aged less than three months	Inclusion criteria: women aged $\geq 17$ , not professionals, in deprived area, healthy term singleton babies of birth weight $>2500$ g	Intervention, monthly support from volunteer starting at three months. Only one or two supports before measurement of breastfeeding outcome	Exclusive breast feeding at four months	No difference in exclusive breastfeeding rates

Table 2 | Assessment of risk of bias

Study	Sequence generation	Allocation concealment	Blinding of outcome assessment	Incomplete outcome data	Selective reporting
Agrasada <sup>29</sup>	Low risk of bias: irregular sized random blocks from random number tables	Unclear risk of bias: sequentially numbered sealed envelopes	Low risk of bias: trained interviewer unaware of mother's allocation group	Low risk of bias: missing data balanced across arms, unclear whether those lost were similar to those remaining, 87% follow-up	Unclear risk of bias
Anderson <sup>19</sup>	Unclear risk of bias: computerised software by study coordinator	Unclear risk of bias	Unclear risk of bias: telephone interviews by bilingual research staff member	Low risk of bias: missing data balanced across arms, no difference in characteristics between those that dropped out and those remaining, 74% follow-up	Unclear risk of bias
Chapman <sup>20</sup>	Low risk of bias: computerised software	Unclear risk of bias	Unclear risk of bias: telephone interviews—data on peer counsellor contact was collected at end of each interview	Low risk of bias: missing data balanced across arms, but unclear whether those lost were similar to those remaining, 93% follow-up	Unclear risk of bias
Coutinho <sup>25</sup>	Low risk of bias: random numbers table	Unclear risk of bias: drawing numbers from envelopes	Low risk of bias: data collected by researchers not aware of group allocation	Low risk of bias: missing data balanced across arms, those lost to follow-up did not differ in characteristics to those remaining, 94% follow-up	Unclear risk of bias
Dennis <sup>23</sup>	Low risk of bias: computerised by independent statistician	Low risk of bias: sequentially numbered sealed opaque envelopes	Low risk of bias: research assistant, blinded to group allocation, telephoned women	Low risk of bias: 99% follow-up	Unclear risk of bias
Di Meglio <sup>22</sup>	Low risk of bias: computer generated random numbers	Unclear risk of bias: sequentially numbered sealed envelopes	Low risk of bias: telephone interview by research assistant with no knowledge of study hypothesis or design	High risk of bias: follow-up rate 59%	Unclear risk of bias
Graffy <sup>6</sup>	Low risk of bias: random permuted blocks by statistician	Unclear risk of bias: sequentially numbered sealed envelopes	Low risk of bias: questionnaires coded blind to treatment allocation	Low risk of bias: similar drop-outs in each arm, 86% follow-up rate	Unclear risk of bias
Haider <sup>28</sup>	Low risk of bias: random number tables used to allocate clusters	Low risk of bias, cluster randomisation: women unaware of hypothesis	High risk of bias: interviewers aware of group assignment	Low risk of bias: missing data balanced across arms, no difference in socioeconomic characteristics of those who dropped out and were followed-up at five months, 79% follow-up	Unclear risk of bias
Jolly <sup>10</sup>	Low risk of bias: stratified computer randomisation of clusters by statistician	High risk of bias: women aware of allocation at recruitment	Low risk of bias: researcher blinded to trial allocation	High risk of bias: follow-up rate 68%	Low risk of bias
Hopkinson <sup>21</sup>	Low risk of bias: random number tables	Low risk of bias: opaque sealed envelopes	Low risk of bias: telephone interview blinded to group assignment	Low risk of bias: missing data balanced across arms, women lost to follow-up did not differ from study sample, 89% follow-up	Unclear risk of bias
Leite <sup>26</sup>	Low risk of bias: computerised random number tables in blocks of 20	Unclear risk of bias: sealed envelopes	Low risk of bias: interviewers unaware of objectives of research	Low risk of bias: missing data balanced across arms, no difference in variables studied for those that dropped out, 86% follow-up.	Unclear risk of bias
Merewood <sup>17</sup>	Low risk of bias: computer generated	Unclear risk of bias: sealed envelopes	Low risk of bias: research assistant unaware of mother's group assignment	High risk of bias: missing data balanced across arms, similar reasons for missing data across arms, 79% follow-up, intention to treat analysis not done	Unclear risk of bias
Mongeon <sup>24</sup>	Low risk of bias: unclear	Unclear risk of bias: drawing of numbered tickets	Unclear risk of bias: telephone interview by research assistant	Low risk of bias: 97% follow-up	Unclear risk of bias
Morrow <sup>27</sup>	Low risk of bias: clusters randomised by computer	Low risk of bias, cluster randomisation: women not informed about other study group	Unclear risk of bias: structured interviews by staff other than peer counsellors	Low risk of bias for exclusive breast feeding, high risk for any breast feeding: missing outcome data balanced across arms, 80% follow-up	Unclear risk of bias
Muirhead <sup>8</sup>	Low risk of bias: random allocation by computer in blocks of 10	Low risk of bias, post recruitment telephone randomisation	Low risk of bias: trial team not involved in questionnaire completion	Low risk of bias: 98% follow-up	Unclear risk of bias
Tylleskar <sup>18</sup>	Low risk of bias: clusters randomised by computer	Unclear risk of bias, cluster randomisation	Low risk of bias: data collectors masked to allocation concealment	Low risk of bias in Burkina Faso and Uganda, follow-up rates ≥87%. High risk of bias in South Africa, follow-up 69%	Low risk of bias

Table 2 (continued)

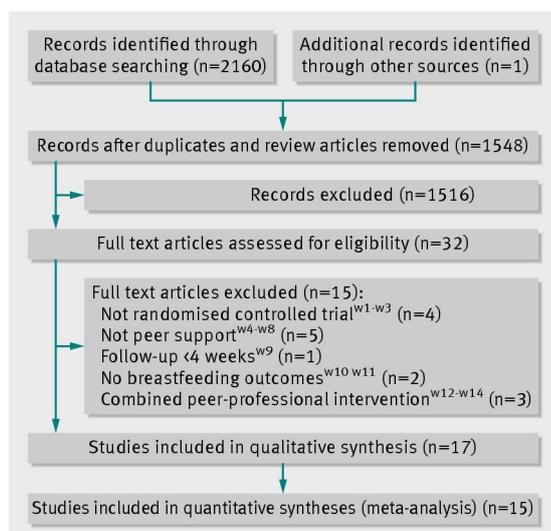
Study	Sequence generation	Allocation concealment	Blinding of outcome assessment	Incomplete outcome data	Selective reporting
Watt <sup>9</sup>	Low risk of bias: random digit computer tables	Low risk of bias, undertaken by administrator not involved in recruitment	Low risk of bias: those responsible for assessing outcomes masked to group assignment	High risk of bias: follow-up rate higher in control (80%) than intervention (73%) at one year's follow-up	Unclear risk of bias

Table 3| Relative risk of not breast feeding at last study follow-up

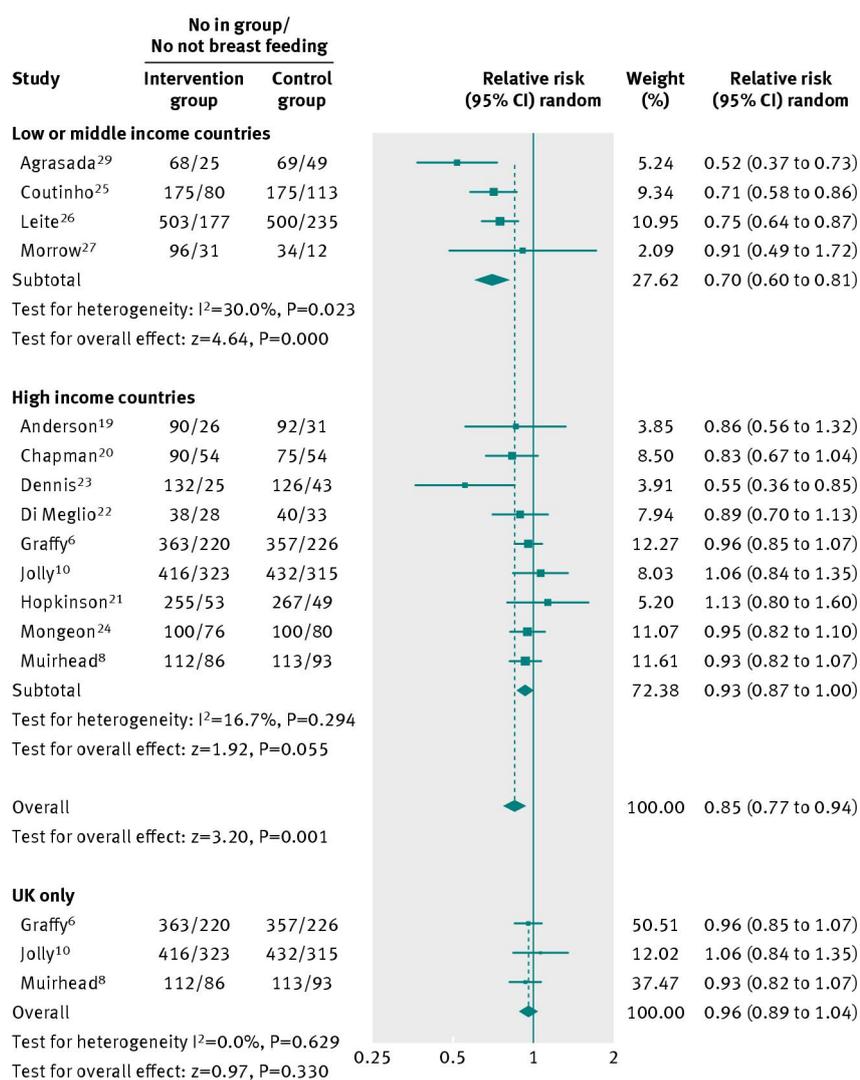
Variables	Any breast feeding			Exclusive breast feeding		
	Relative risk (95% CI)	I <sup>2</sup> (%)	Metaregression P value	Relative risk (95% CI)	I <sup>2</sup> (%)	Metaregression P value
All	0.85 (0.77 to 0.94)	61.7	—	0.82 (0.76 to 0.88)	89.7	—
Setting:						
High income countries	0.93 (0.87 to 1.00)	16.7	<0.001	0.90 (0.85 to 0.97)	82.4	0.013
Low or middle income countries	0.70 (0.60 to 0.82)	30.0		0.63 (0.52 to 0.78)	93.4	
Intensity:						
<5 planned contacts	0.99 (0.90 to 1.09)	0.0	0.020	0.83 (0.70 to 1.00)	87.5	0.729
≥5 planned contacts	0.80 (0.71 to 0.89)	62.7		0.81 (0.74 to 0.88)	90.9	
Timing:						
Antenatal and postnatal period	0.94 (0.88 to 1.01)	0.0	<0.001	0.79 (0.71 to 0.88)	91.5	0.379
Postnatal period only	0.75 (0.63 to 0.89)	64.5		0.82 (0.86 to 0.88)	84.7	

Separate metaregressions were undertaken for any and exclusive breast feeding for each of: setting, intensity, and timing of peer support.

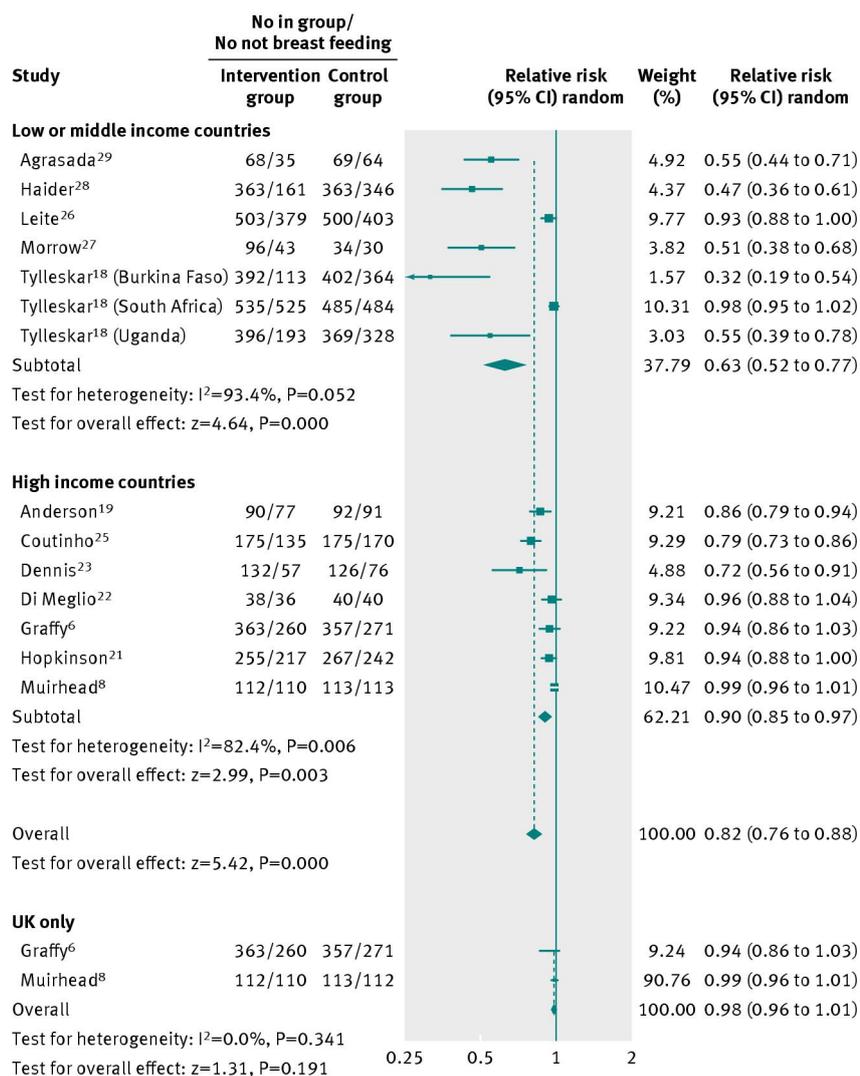
## Figures



**Fig 1** Identification of relevant literature on peer support to improve breastfeeding rates



**Fig 2** Relative risk of not breast feeding at last study follow-up by setting



**Fig 3** Relative risk of not exclusively breast feeding at last study follow-up by setting

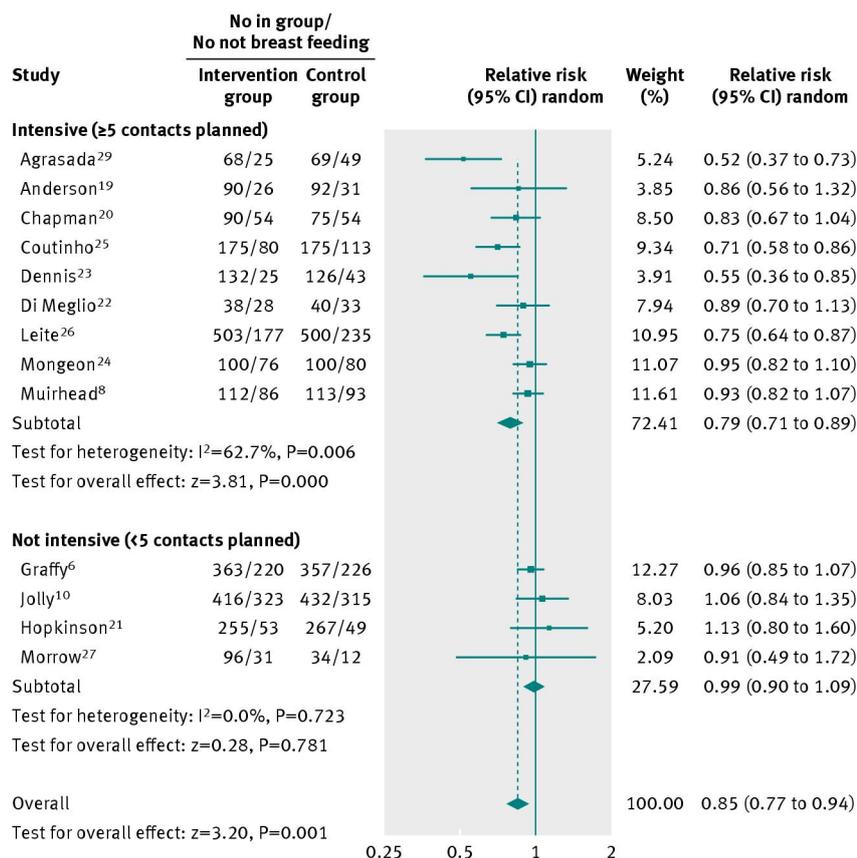


Fig 4 Relative risk of not breast feeding at last study follow-up by intensity

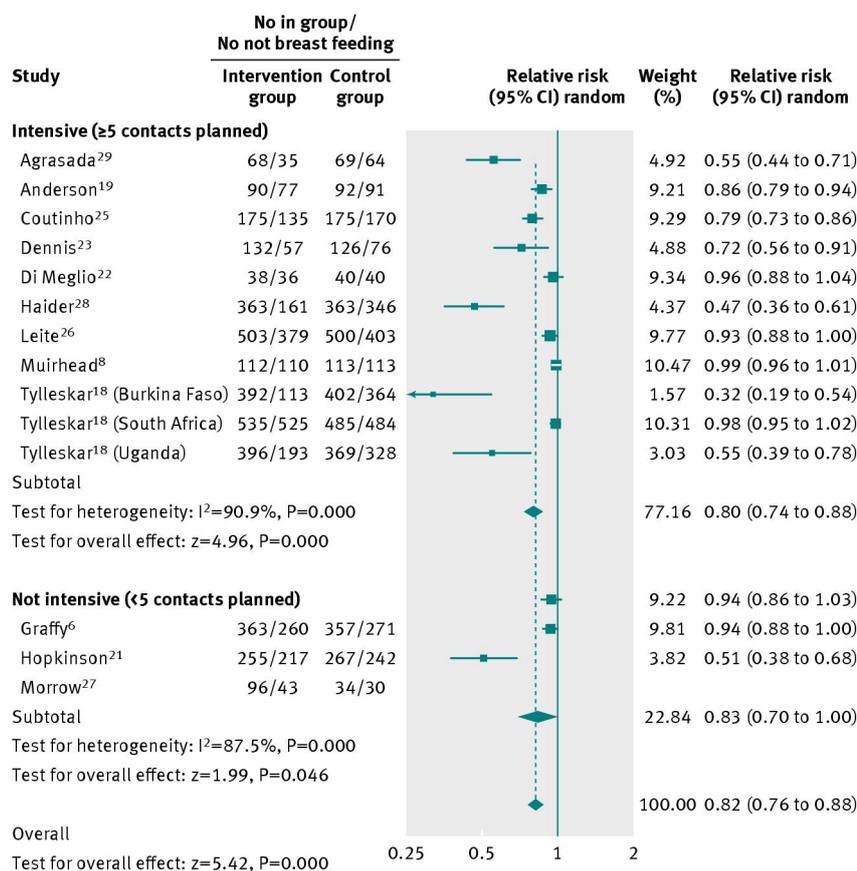
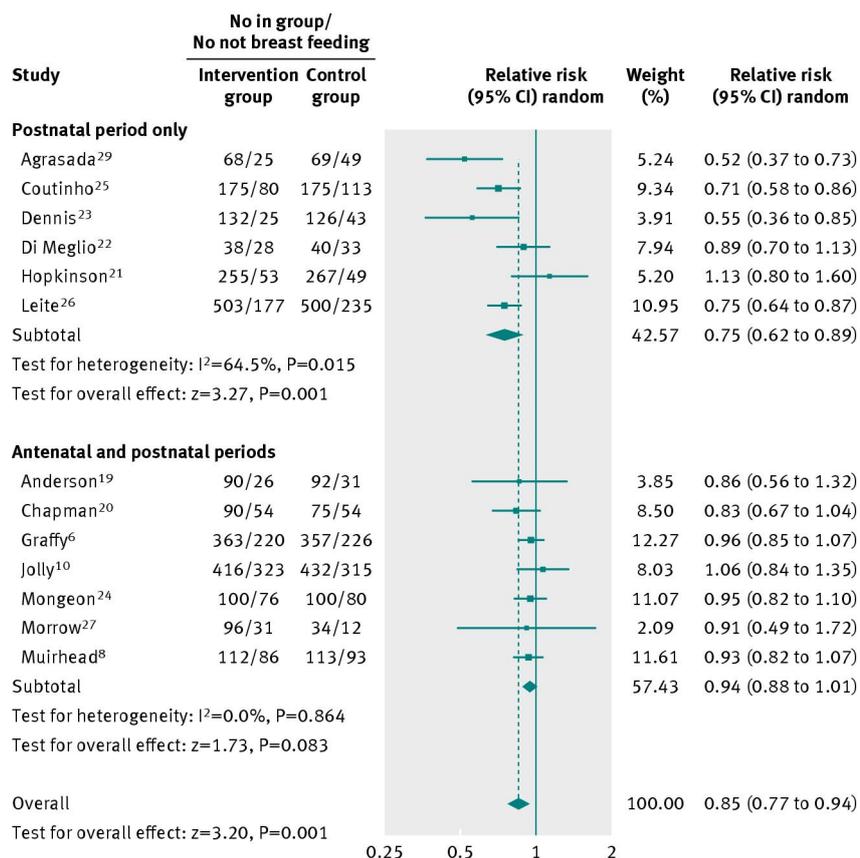
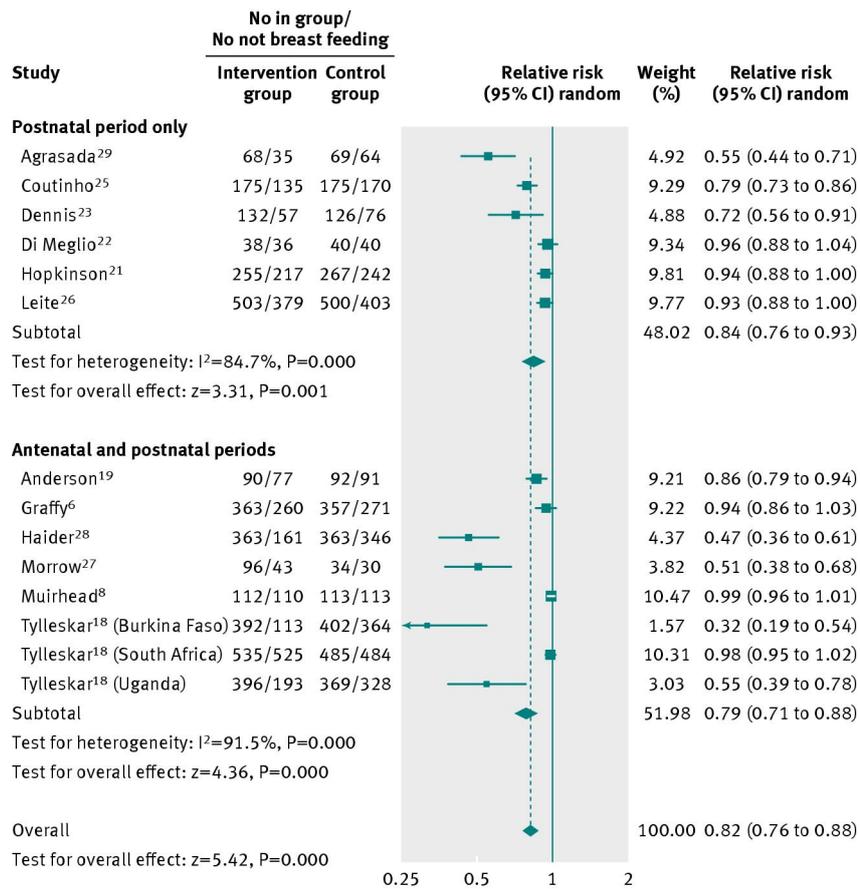


Fig 5 Relative risk of not exclusively breast feeding at last study follow-up by intensity



**Fig 6** Relative risk of not breast feeding at last study follow-up: timing of support



**Fig 7** Relative risk of not exclusively breast feeding at last study follow-up: timing of support