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Title:

Group versus Individual Professional Antenatal Breastfeeding Education for Extending Breastfeeding Duration and Exclusivity: a Systematic Review

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Abstract

Although breastfeeding initiation rates have increased substantially in many developed countries over the past several decades, breastfeeding duration and exclusivity remain suboptimal. In the antenatal period, both group and individual education interventions have been implemented to improve breastfeeding. The purpose of this review was to compare the effectiveness of group and individual antenatal professional education on breastfeeding exclusivity and duration. A systematic search of the literature was conducted using Medline (1946- June 2014), PubMed (1883- June 2014), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1947- June 2014), EMBASE (1947- June 2014), British Nursing Index (1994- June 2014), Google Scholar and the Cochrane Library. Included studies were limited to healthcare professional-conducted education delivered to pregnant women only. Only studies reporting breastfeeding duration or exclusivity were included. Nineteen studies were included, of which thirteen evaluated antenatal group education, five evaluated individual antenatal education, and one evaluated both a group and an individual antenatal education. When compared with standard care, four out of 12 studies supported the effectiveness of antenatal group education on breastfeeding duration or exclusivity, while four out of six studies supported the effectiveness of antenatal individual education. Two studies compared antenatal group education with peer-led education and neither study showed a significant difference in breastfeeding outcomes. The methodological heterogeneity and the small number of high quality studies limited our ability to draw firm conclusions about the effectiveness of either mode of antenatal education.

Background

Breastfeeding is the optimal method of infant feeding¹ and not breastfeeding is associated with short and long-term health risks to both infants and mothers.² The World Health Organization recommends exclusive breastfeeding for the first six months of life, with continued breastfeeding for up to two years of age and beyond along with the appropriate introduction of complementary food.³ Breastfeeding initiation rates in many high-income, developed countries have increased substantially in the past one to two decades, but the duration and exclusivity of breastfeeding remain suboptimal.⁴⁻¹⁰

Numerous education interventions have been implemented with the aim of increasing both breastfeeding duration and exclusivity. Reviews have shown that some interventions are effective in improving breastfeeding duration and exclusivity, especially in regions with high initiation rates.¹¹⁻¹⁴ Various authors have reviewed and evaluated the format of breastfeeding education interventions, such as face-to-face contact versus telephone contact,¹¹⁻¹³ and found evidence that face-to-face interventions are more effective in improving breastfeeding rates. Other reviewers have compared the effectiveness of professional breastfeeding support with peer support.^{11,14} Reviews of peer support have concluded that peer interventions are more effective in low or middle-income countries,¹⁵ or when conducted with minority populations.¹⁶ Reviewers also generally agree that longer-term interventions or interventions started during pregnancy and continuing through the postnatal period yield more positive results.^{12,13,17} However, highly heterogeneous interventions consisting of multiple components across the antenatal and postnatal period complicate the assessment of the effectiveness of the individual intervention components and the determination of the most effective time to deliver the interventions.¹⁸

When compared with reviews focusing on postnatal breastfeeding interventions, there are far fewer reviews of antenatal breastfeeding interventions. One recently published Cochrane review included all forms of antenatal interventions aimed at increasing breastfeeding duration.¹⁹ Comparisons were made between a single intervention and routine care, different types of interventions, multi-component versus single-component interventions, and various types of multi-component interventions. The reviewers however, did not compare the effectiveness of group versus individual prenatal education in improving breastfeeding duration or exclusivity. Group and individual education are the most common strategies used during the antenatal period to promote breastfeeding,¹⁷ thus a comparison between these two forms of education is meaningful. One review published in 2001 suggested that group education was the only strategy during pregnancy that had been shown to extend breastfeeding duration.¹² However, the review included only one study reporting on the effectiveness of one-to-one individual education because the existing evidence at that time was limited. Two further reviews compared the effectiveness of group versus individual antenatal education on several pregnancy outcomes.^{20,21} One review excluded studies focused only on improving breastfeeding outcomes and no breastfeeding data were reported.²⁰ The second review examined the impact of group versus individual antenatal education on rates of preterm birth and low birth weight, breastfeeding initiation and duration were secondary outcomes only.²¹ Based on that review, one randomized study favored group education and one cohort study showed no significant difference in extending mean breastfeeding duration.²¹

The purpose of this review was to evaluate and compare the effectiveness of group and individual antenatal professional education on breastfeeding exclusivity and duration. Determining the effectiveness of antenatal education in promoting breastfeeding duration and exclusivity is important as many new mothers report that they are largely unprepared for their

early breastfeeding experiences.²²⁻²⁵ Furthermore, even among mothers intending to exclusively breastfeed, newborns are frequently supplemented with infant formula early in the postnatal period and supplements have a substantial negative impact on breastfeeding duration.²⁶⁻²⁸ Thus antenatal breastfeeding education if effective, offers an opportunity to intervene early and increase rates of exclusive breastfeeding and extend overall breastfeeding duration.

Methods

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guideline.²⁹

Literature search

We searched Medline (1946-June 2014), PubMed (1883-June 2014), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1947-June 2014), EMBASE (1947-June 2014), British Nursing Index (1994-June 2014), Google Scholar and the Cochrane Library using comprehensive search strategies. The following search terms in all fields regardless of publication date were used: (1) 'breastfeed\$' *or* 'breast feed\$' *or* 'infant feed\$'; (2) 'antenatal' *or* 'antepartum' *or* 'prenatal'; (3) 'intervention\$' *or* 'support' *or* 'education'; and (4) #1 *and* #2 *and* #3. The reference lists of identified articles were reviewed to identify additional studies.

Inclusion criteria

Inclusion criteria included original studies published in English with pregnant women as participants, professional antenatal breastfeeding education as an intervention without any intrapartum, postpartum or peer components, with subgroups available for comparison, and

reporting rates of exclusive or any breastfeeding duration as outcome measures. Only studies that were randomized controlled trials or quasi-experimental studies were included.

Professional antenatal breastfeeding education was defined as any form of education, either practical or psychological breastfeeding preparation or both, focusing on delivering breastfeeding information to pregnant women or parents-to-be by healthcare professionals, such as nurses, midwives, doctors or nutritionists, in either group or individual format. Group antenatal breastfeeding education was defined as a group of pregnant women of similar gestational age meeting together to receive antenatal breastfeeding education. The group education activities must be the core component of the intervention. Individual antenatal breastfeeding education was defined as education activities providing one-to-one contact(s) between a breastfeeding educator and the participants in the context of a breastfeeding intervention. Interventions without any face-to-face interaction between the educator and participants or ones that included fathers-to-be as the only target audience were excluded.

Outcomes measures

The primary outcomes assessed were the duration of exclusive or any breastfeeding. The definition of exclusive and any breastfeeding were developed in accordance with World Health Organization definitions.³⁰ Exclusive breastfeeding was defined as the infant receiving only breast milk as the source of food, either directly from the breast or expressed breast milk. Predominant breastfeeding was defined as receiving breast milk as the predominant source of food, without restriction of water or water-based fluids. Any breastfeeding was defined as receiving any breast milk, both directly from the breast or expressed breast milk, without any restriction on other food or liquid, including non-human milk. Breastfeeding outcomes reported in studies that were not consistent with the above definitions were reported accordingly.

Data extraction and critical appraisal

Two of the authors (KW & KL) reviewed the titles and abstracts of all identified citations. Potentially relevant citations were reviewed in full text format and selected according to the inclusion criteria. Any uncertainty about the relevance of potential studies was resolved through discussion and by consensus.

KW & KL independently extracted the relevant data from the full-text of eligible articles, including year, study design, participants, country of origin, nature of the intervention, study outcomes and information on potential bias. Any disagreements about the interpretation of the information extracted were resolved through discussion and consensus.²⁹

Data synthesis and meta-analysis were not possible as there were substantial differences in the content and length of the interventions, the outcome measures, the target population, and the standard care provided to the comparison groups.

Quality assessment

The risk of bias of selected studies was assessed using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Intervention*.³¹ Two of the authors (KW & KL) specifically assessed random sequence generation, allocation concealment, blinding of outcome assessors, incomplete outcome data, selective reporting bias and other possible sources of biases. The methods of random sequence generation and allocation concealment can help assess the risk of selection bias. Assessing for blinding of those assessing the study outcomes and the reporting of incomplete outcome data can assess the risks of detection bias and attrition bias, respectively. Blinding of participants and those delivering the interventions was not assessed due to the nature of those interventions.

Results

A total of 3935 citations were retrieved in the preliminary search with 1671 citations remaining after removing duplicates (Figure 1). All citations were screened. The abstracts of potentially relevant citations were reviewed and 42 studies were reviewed in full-text. Of these studies, 19 were included in this review. Seven studies were conducted in the United States (US),³²⁻³⁸ four in Australia,³⁹⁻⁴² three in Canada,⁴³⁻⁴⁵ two in Singapore,^{46,47} one in Denmark,⁴⁸ one in Chile⁴⁹ and one in England (UK).⁵⁰ Although we did not limit our search to developed countries, all studies were conducted in countries that were listed by the World Bank as high-income economies.⁵¹ Fourteen studies were individually randomized controlled trials^{32-37,39-41,43,44,46-48} while one was a cluster randomized controlled trial.⁵⁰ Four used a quasi-experimental design.^{38,42,45,49} The characteristics of included studies are outlined in Table 1.

Participants

All trials recruited healthy pregnant women at low risk of developing obstetric and medical complications, who were expecting healthy infants and who were free from physical conditions that contraindicated breastfeeding. After excluding the postnatal treatment arms from the studies, a total of 6931 pregnant women provided data for this review. One study³⁷ did not provide the number of participants who attended the intervention, so all participants were included. One study included participants who received obstetric care at the study sites and did not specify other recruitment criteria.³⁸ Eight studies included nulliparous women only^{33,34,39,40,42-44,48} while the remaining studies included both nulliparous and multiparous women. Six studies restricted recruitment to participants intending to breastfeed^{39,43,44,46,49,50} while the others did not specify the prenatal infant feeding intention of participants. Seven included women with a singleton pregnancy only^{37,42-44,46-48} while one study specified that if a participant gave birth to twins, only twin A would be included in the study.³³ Most studies selected participants who were representative of the general population,

but six studies specifically recruited minority groups such as Black³² and Hispanic women in the United States,³⁴ Vietnamese immigrants in Australia,⁴¹ and low-income populations.³⁵⁻³⁷ Mattar et al.⁴⁷ recruited participants without obstetrical complications that would contraindicate vaginal delivery. All other studies did not restrict participants by mode of delivery.

Mode of interventions

The modes of interventions were divided by group education and individual education. Seven studies conducted antenatal group education alone as interventions. Of these, five compared antenatal group education with standard care,^{32,38-40,49} and two compared it with a peer-led breastfeeding class.^{42,45} Six studies compared standard care with antenatal group education plus educational materials such as pamphlets, guides, booklets or/ and video.^{35,41,43,44,48,50} One study compared standard care with antenatal group education, educational materials and marketing incentives in the form of food packages.³⁶ Four studies compared standard care with individual antenatal education alone^{32-34,37} while two other studies compared standard care with antenatal individual education plus educational materials.^{46,47}

Frequency and length of interventions

Most of the reviewed studies offered one session of antenatal education to participants in either a group format or on a one-to-one basis, with the exception of Forster et al.,⁴⁰ Rossiter et al.⁴¹ and Bonuck et al.³⁷ who provided two, three and five sessions respectively. The length of antenatal group education ranged from 20 minutes to 2.5 hours per session while the length of antenatal individual education ranged from 15 minutes to approximately one hour. In Bonuck et al.'s intervention,³⁷ health care providers asked two to three brief breastfeeding questions at each of the five antenatal visits. The exact length of the

intervention was not specified. Tanner-Smith et al.³⁸ did not specify the intensity and length of the intervention.

Standard care

Standard care or education offered by the study hospitals was available to participants in the control group of eight studies.^{32,34,38,39,43,44,47,48} Standard breastfeeding education was provided in four studies.^{35,36,40,50} Breastfeeding support by a lactation consultant was included in standard care in three studies.^{37,40,46} One study included peer support through community breastfeeding support groups⁴⁰ while two studies provided peer-led breastfeeding education to the control group.^{42,45} Educational materials were given to control-group participants in three studies.^{34,36,41} One study provided telephone counseling and a postnatal home visit,⁴⁰ another included a postnatal pediatric visit,³³ while another provided community-wide interventions unrelated to breastfeeding.⁴⁹

Quality of the studies

The quality of the studies varied (Figure 2). Seven out of 19 studies had adequate sequence generation by means of computer generated sequence,^{40,46-48} undisclosed blocking factor³⁷ and random number tables.^{32,33} Eight studies were at low risk of bias for allocation concealment by use of either sealed opaque envelopes,^{34,37,43,44,50} telephone randomization^{40,46} or concealing the treatment allocation for the participant until written informed consent was obtained.⁴⁷ There was inadequate or unclear information to assess eight studies for sequence generation^{34-36,39,41,43,44,50} and seven studies for allocation concealment.^{32,33,35,36,39,41,48} Four studies had high risk of bias for both sequence generation and allocation concealment due to the use of quasi-experimental design.^{38,42,45,49} Eight studies blinded the outcome assessors.^{37,39,42-45,47,50} One study had high risk of detection bias due to the use of retrospective design³⁸ while the remainder did not provide any information on this aspect.

The majority of studies had low risk of attrition bias with similar dropout rates across groups ranging from 0% to 15%. Four studies did not state the difference in drop-out rates between groups.^{32,37,39,41} Two studies were at high risk of bias due to high attrition rates (39.5%)⁴⁵ or highly imbalanced drop-out rates between groups (36.7% vs. 3.3%).³⁶ Assessment of attrition bias was not applicable in one quasi-experimental study due to the use of a retrospective design.³⁸ The risk of selective reporting could not be assessed in most of the studies since we did not have access to the protocols of those studies. Three studies had low risk of selective reporting bias.^{37,46,47} The risk of other potential sources of biases was either unclear^{35,38-40,42,45,48-50} or low.^{32-34,36,37,41,43,44,46,47}

Effectiveness of interventions

Group antenatal education

Altogether, there were 12 studies that compared antenatal group education with standard care (Table 2).^{32,35,36,38-41,43,44,48-50} Five compared antenatal group education alone,^{32,38-40,49} six compared antenatal group education plus the provision of educational materials^{35,41,43,44,48,50} and one examined the effectiveness of antenatal group education, educational materials and marketing incentives.³⁶ Four (33%) showed a significant improvement in either full or any breastfeeding rates at different time periods.^{32,39,41,49} Two studies that included one session of education demonstrated a significant increase in full breastfeeding up to six months postpartum.^{39,49} However, the definition of full breastfeeding was not provided by Duffy et al.³⁹ Pugin et al.⁴⁹ used Labbok and Coffin's⁵² widely accepted definition to define full breastfeeding, whereby infrequent intake of water, juice or ritualistic feeds in addition to exclusive breastfeeding was allowed. Two studies showed a significant increase in any breastfeeding at four weeks and three months postpartum,^{32,41} of which one included three sessions of antenatal group education.⁴¹

Two studies compared traditional nurse-led antenatal group education with peer-led classes (Table 2).^{42,45} Neither intervention significantly improved breastfeeding outcomes in the study participants.

Individual antenatal education

There were six studies that compared individual antenatal education with standard care,^{32-34,37,46,47} of which four (67%) significantly increased exclusive or any breastfeeding rates^{32,34,46,47} (Table 2). Among these six studies, four provided antenatal education only^{32-34,37} and two provided additional printed educational materials.^{46,47} One study reported a significant increase in exclusive breastfeeding at six weeks, three months and six months postpartum⁴⁶ while another one showed a significant increase in exclusive and predominant breastfeeding at three months postpartum.⁴⁷ One study increased the rate of any breastfeeding at two weeks postpartum only³² while another showed a significant difference in the mean days of breastfeeding at 42 days postpartum.³⁴

Discussion

When compared with standard care, both group and individual professional antenatal education show some effect in extending the duration of exclusive and/or any breastfeeding when targeted at vulnerable populations, such as the minority groups,^{32,34,41} or low income^{39,46,47} and low education participants.^{46,47} Studies examined the effect of antenatal breastfeeding education on low-risk, educated women failed to find significant effects.^{42-45,48,50} Four out of six studies supported the effectiveness of individual antenatal education compared with four out of 12 studies assessing the effectiveness of group education. However, due to limited number of studies examining individual antenatal education and the heterogeneity and lower quality of studies examining group antenatal education, no conclusions could be drawn on the effectiveness of either mode of education. In addition,

antenatal breastfeeding education may have a limited effect on longer-term breastfeeding rates as most studies demonstrating the effectiveness of antenatal breastfeeding education observed a significant effect on breastfeeding outcomes within the first three months postpartum only.^{32,34,39,41} Only two studies found antenatal education to be effective in increasing breastfeeding rates at 6 months postpartum.^{46,49}

Most of the retrieved studies did not provide comprehensive information for a thorough assessment of the risk of bias. Only one study was assessed to have high methodological integrity due to low risk of selection, detection, attrition and selective reporting bias.⁴⁷ Another published review¹⁹ rated the selective reporting bias of Mattar et al.'s study⁴⁷ as unclear, which may have been because an incorrect trial registration number was reported in the published article. We searched the appropriate trial registry using the keywords “breastfeeding” and “antenatal” and were able to find the appropriate study protocol. Thus, the selective reporting bias was rated as low. All other studies had either high or unclear risk of these biases. The internal validity of this review is limited as the content of the antenatal breastfeeding education, the outcome measures, and the time points for measuring breastfeeding duration varied substantially among the studies.

There were some methodological limitations of the reviewed studies. First, some studies did not provide clear definitions of the breastfeeding outcomes measured³⁹ or did not measure the prevalence of exclusive and any breastfeeding at different time points,^{34,36,42,47,49} which made the results difficult to synthesize and compare. More than one-half of the studies had relatively small numbers of participants. Six studies had fewer than 50 participants in each treatment group^{32,34-36,39,44} and a further six studies had fewer than 100 participants.^{33,41-43,45,49} As most studies recruited participants who were healthy pregnant women, such a sample size might not be adequate to detect the small to moderate effect sizes usually produced by educational interventions.³² In addition, some studies included multiparous

women as participants.^{32,35-38,41,45-47,49,50} As previous breastfeeding experience can substantially influence current breastfeeding outcomes,⁵³⁻⁵⁵ the effectiveness of the intervention may have been reduced. Furthermore, many studies measured breastfeeding initiation rates as well as breastfeeding duration and thus recruited participants who had not yet made up their mind to breastfeed.^{32-38,40-42,45,47,48} This might also reduce the effectiveness of the intervention as some participants may not have eventually initiated breastfeeding. Some interventions also included non-breastfeeding content, which could potentially dilute the effect of the breastfeeding education.^{33,38,48} In addition, the content of the intervention was insufficiently described in many studies,^{33,35-38,40-44,48,50} thus identifying effective intervention components was difficult. Finally, the effectiveness of interventions may also have been influenced by the different practices that constitute standard care in the various countries. These practices were not accounted for in the current review.

Although there was substantial variation between the settings and participants among the reviewed studies, this review provides some guidance for clinical practice. The current level of evidence is insufficient to recommend comprehensive individual or group antenatal breastfeeding education for all expectant parents as a strategy to improve breastfeeding outcomes. There is some evidence to suggest that one-to-one antenatal breastfeeding education may be effective in vulnerable populations, such as low-income and low-education women, minority groups, and new immigrants. Individualized education that is more tailored to the needs of vulnerable groups may help improve breastfeeding rates when compared with the typical prenatal group breastfeeding classes because the latter format does not adequately address barriers to learning such as language, learning style and group power dynamics.⁵⁶⁻⁵⁸

Further research is needed to confirm the present findings on the effectiveness of individual education on breastfeeding duration, with more diverse populations. In general, future research on antenatal breastfeeding education interventions should be more rigorously

conducted, with an adequate sample size, a clear description of independent and dependent variables, and specifically assess both the duration of any and exclusive breastfeeding according to widely accepted definitions.⁵⁹ In addition, to facilitate the comparison of breastfeeding outcomes between various intervention studies, it may be necessary to standardize the reporting of breastfeeding rates at critical time points in the postpartum period. Based on the reviewed studies, breastfeeding status at 6 weeks, 3 months and 6 months postpartum were most commonly reported. Given the recommendations for exclusive breastfeeding for at least 6 months,^{2,3} rates of any and exclusive breastfeeding should be measured up to this time point. Such guidelines would provide the necessary consistency required to assess and compare the impact of many different types of breastfeeding support interventions on both breastfeeding duration and exclusivity. In addition, a review examining interventions given during both the antenatal and postpartum periods suggested that combining individual and group counseling was more effective than individual or group counseling alone.⁶⁰ Thus, further research to explore the effectiveness of combining both individual and group antenatal breastfeeding education may be beneficial. Also, as the majority of reviewed studies contained only one session of education, it may be worthwhile to assess the effectiveness of more intensive antenatal education interventions on breastfeeding exclusivity and duration. Finally, the evaluation of non-face-to-face interventions to increase breastfeeding rates is also an important future strategy as the rise of technology and social media both provide a new frontier in the development of health interventions.^{61 62}

There are some strengths and limitations of this review. To our knowledge, it is the first systematic review evaluating the effectiveness of group versus individual education, which are the two most commonly used methods of breastfeeding promotion during the antenatal period.¹⁷ We limited the included interventions to the antenatal period, which could

help to determine the effect of antenatal only interventions. However, this review only included studies published in English language. Potential articles published by non-English speaking countries may have been excluded. All the retrieved studies were conducted in developed countries with relatively high education levels and more advanced breastfeeding support systems. Thus, the generalizability of this review may be limited to similar settings. This review only focused on face-to-face interventions and excluded interventions that did not require face-to-face contact, such as telephone interventions⁶³ internet-based interventions.⁶⁴ As there is an increasing trend toward delivering non-face-to-face interventions, this is a potential area for future research.

Conclusion

Strong conclusions about the effectiveness of group versus individual antenatal breastfeeding education cannot be drawn due to substantial methodological heterogeneity and a limited number of high quality studies. There is a need for high quality trials with an adequate sample size to ascertain the effect of these two modes of professional antenatal breastfeeding education on breastfeeding duration and exclusivity.

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Figure 1. Flow diagram of the literature search

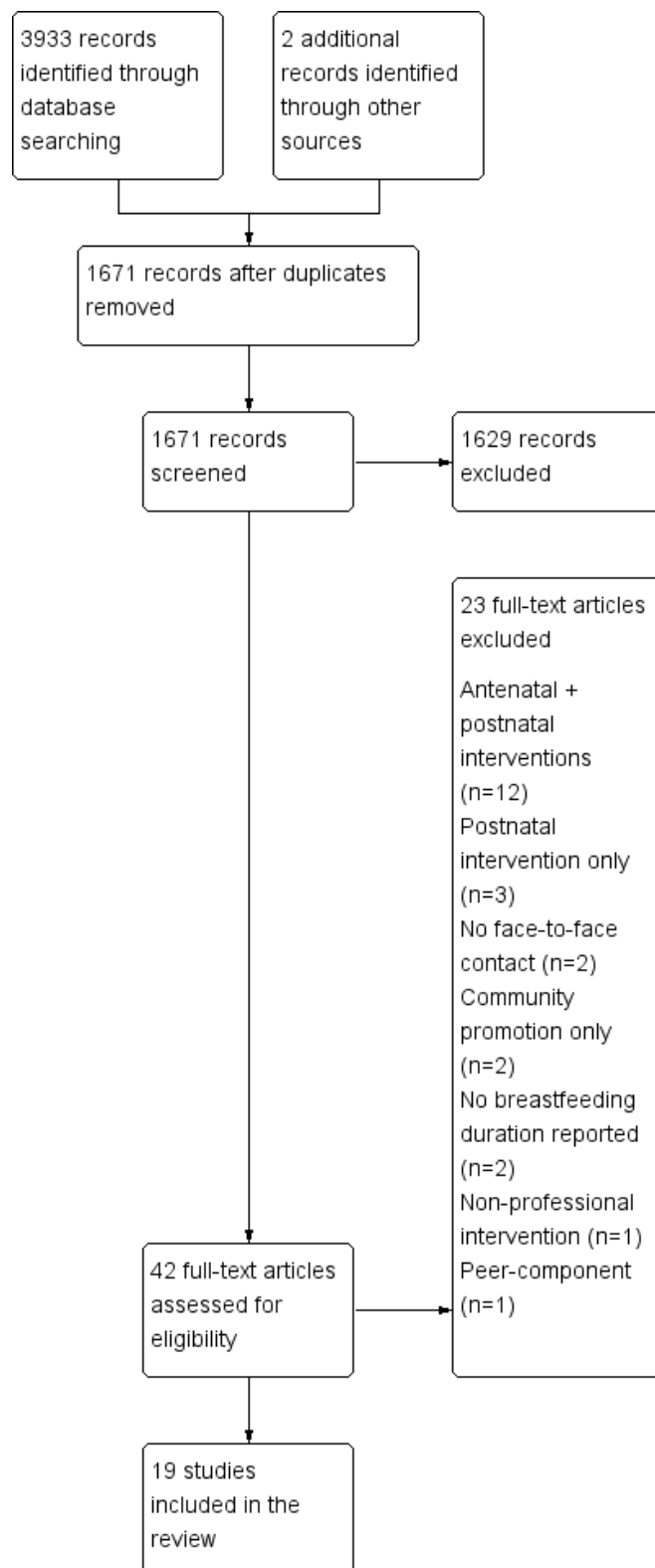


Figure 2. Risk of Bias Summary: Reviewers' Judgment about the Risk of Bias for Each Included Study based on criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions*

| | | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of outcome assessment (detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) | Other bias |
|-----------------------------------------------------------------|---------------------------------|---------------------------------------------|-----------------------------------------|-------------------------------------------------|------------------------------------------|--------------------------------------|------------|
| Group-based interventions | Duffy 1997 | ? | ? | + | ? | ? | ? |
| | Finch 2002 | ? | ? | ? | - | ? | + |
| | Forster 2004 | + | + | ? | + | ? | ? |
| | Hill 1987 | ? | ? | ? | + | ? | ? |
| | Kluka 2004 | ? | + | + | + | ? | + |
| | Kronborg 2012 | + | ? | ? | + | ? | ? |
| | Lavender 2005 | ? | + | + | + | ? | ? |
| | Noel-Weiss 2006 | ? | + | + | + | ? | + |
| | Pugin 1996 | - | - | ? | + | ? | ? |
| | Rempel 2012 | - | - | + | - | ? | ? |
| | Rossiter 1994 | ? | ? | ? | ? | ? | + |
| | Sheehan 1999 | - | - | + | + | ? | ? |
| | Tanner-Smith 2013 | - | - | - | ? | ? | ? |
| | Individual -based interventions | Bonuck 2014 | + | + | + | ? | + |
| Mattar 2007 | | + | + | + | + | + | + |
| Schlickau 2005 | | ? | + | ? | + | ? | + |
| Serwint 1996 | | + | ? | ? | + | ? | + |
| Su 2007 | | + | + | ? | + | + | + |
| Intervention that contains both group and individual components | Kistin 1990 | + | ? | ? | ? | ? | + |

(+) = Low risk; (-) = High risk; (?) = Unclear risk

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|----------------------------------|-------------------------------------------------------------------|-----------------|------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------|
| Group-based Interventions | | | | | | | |
| Duffy, 1997 ³⁹ | Primiparas, >36 weeks GA ^c , intend to BF ^d | Australia | RCT ^a | Total: 75 IG ^h : 37 CG ⁱ : 38 | <u>IG^h</u> teaching session + standard care <u>CGⁱ</u> Standard care | Senior IBCLC ^m | Full BF ^d at 6 weeks PP ^l |
| Finch, 2002 ³⁶ | Predominantly pregnant women living in poverty | US | RCT ^a | Total: 60 IG ^h : 30 CG ⁱ : 30 | <u>IG^h</u> BF ^d education + incentive marketing + handouts + educational materials and support + standard care <u>CGⁱ</u> Educational materials and support + standard BF ^d education | Lactation counselor | Median duration of ABF ^f |
| Forster, 2004 ⁴⁰ | Primiparas, 16-24 weeks GA ^c | Australia | RCT ^a | Total: 984 IG ^h 1: 327 IG ^h 2: 329 CG ⁱ : 328 | <u>IG^h1</u> 1 practical skills session + standard care <u>IG^h2</u> 2 sessions focusing on changing attitudes to BF ^d + standard care <u>CGⁱ</u> Standard BF ^d education + IBCLC ^m support + community peer support + telephone counselling + PN ^k home visits | Midwives or specifically trained community educator | ABF ^f and EBF ^e at 6 months PP ^l |

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|------------------------------|-------------------------------------------------------------------------------------------|-----------------|--------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------|
| Hill, 1987 ³⁵ | Low-income pregnant women, subsequently delivered a healthy infant | US | RCT ^a | Total: 64 IG ^h : 31 CG ⁱ : 33 | <u>IG^h</u> Lecture and discussion + question and answer + pamphlet + standard care <u>CGⁱ</u> Standard BF ^d education | Nurse | ABF at 6 weeks PP ^l |
| Kluka, 2004 ⁴³ | Primiparas, in 3 rd trimester, intend to BF ^d , singleton pregnancy | Canada | RCT ^a | Total: 209 IG ^h : 111 CG ⁱ : 98 | <u>IG^h</u> Pre-workshop guide + AN ^j group workshop + standard care <u>CGⁱ</u> Standard care | IBCLC ^m | EBF ^c and ABF ^f at 2 weeks, 3 months and 6 months PP ^l |
| Kronborg, 2012 ⁴⁸ | Primiparas, 30-35 weeks GA ^c , singleton pregnancy | Denmark | RCT ^a | Total: 1193 IG ^h : 603 CG ⁱ : 590 | <u>IG^h</u> 'Ready for Child Programme' containing 3 modules, including BF ^d + film + standard care <u>CGⁱ</u> Standard care | Midwives | Full BF ^d and ABF ^f at 6 weeks and 12 months PP ^l |
| Lavender, 2005 ⁵⁰ | Low-risk pregnant women, in 3 rd trimester, intend to BF ^d | UK | Cluster RCT ^a | Total: 1312 IG ^h : 633 CG ⁱ : 679 | <u>IG^h</u> Educational support session + video + standard care <u>CGⁱ</u> Standard BF ^d education | Community midwife | ABF ^f at 2 weeks, 4 weeks, 6 weeks, 4 months, 6 months and 12 months PP ^l |

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|--------------------------------|---------------------------------------------------------------------------------------------|------------------------|------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Noel-Weiss, 2006 ⁴⁴ | Primiparas, subsequent uncomplicated birth, intend to BF ^d , singleton pregnancy | Canada | RCT ^a | Total: 101 IG ^h : 47 CG ⁱ : 45 | IG ^h Group teaching + video + standard care CG ⁱ Standard care | Not specified Nurse or IBCLC ^m | EBF ^c and ABF ^f at 4 weeks, 8 weeks PP ^l Mean duration of ABF ^f |
| Pugin, 1996 ⁴⁹ | Pregnant women intending to BF ^d | Chile | QES ^b | Total: 422 IG ^h : 59 CG ⁱ : 363 | IG ^h AN ^j group BF ^d skills education + 5 community-wide interventions not related to BF ^d CG ⁱ 5 community-wide interventions not related to BF ^d | Midwife | Full BF ^d at 6 months PP ^l |
| Rempel, 2012 ⁴⁵ | Pregnant women willing to attend the classes | Canada | QES ^b | Total: 109 IG ^h : 54 CG ⁱ : 55 | IG ^h Nurse-led workshop + BF ^d demonstration + handbook CG ⁱ Peer-led class + question and answer time | Nurses, peer counselors | EBF ^c and ABF ^f at 4 weeks and 6 months PP ^l |
| Rossiter, 1994 ⁴¹ | Pregnant Vietnamese immigrants, ≥12 weeks GA ^c | Australia | RCT ^a | Total: 194 IG ^h : 108 CG ⁱ : 86 | IG ^h Video + 3 small-group discussion sessions + standard care CG ⁱ BF ^d and childbirth pamphlets | Hospital's parenthood educators | ABF ^f at 4 weeks and 6 months PP ^l |

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|----------------------------------|------------------------------------------------------------------|------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Sheehan, 1999 ⁴² | Primiparas, singleton pregnancy | Australia | QES ^b | Total: 179 IG ^h : 68 CG ⁱ : 86 | IG ^h Nurse-led AN ^j BF ^d class CG ⁱ Peer-led AN ^j BF ^d education | Nurses, peer counselors | Full BF ^d and ABF ^f at 2 months, 3 months and 6 months PP ^l |
| Tanner-Smith, 2013 ³⁸ | Obstetric patients who received prenatal care at the study sites | US | QES ^b | 794 IG ^h : 308 CG ⁱ : 486 Only 2 out of 4 study sites (n=260) provided data for outcomes of interest | IG ^h CenteringPregnancy group prenatal care CG ⁱ Standard care | Certified nurse-midwives, physicians, licensed practical nurses, advanced practice nurses, midwives, and doulas | ABF ^f and EBF ^e at 6 weeks PP ^l |

Individual-based Interventions

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Bonuck, 2014 ³⁷ | In 1 st or 2 nd trimester, singleton pregnancy, low-risk pregnant women, predominantly pregnant women living in poverty | US | 2 RCTs ^a (PAIRINGS & BINGO) Only BINGO included in this review | BINGO: 666 | <u>BINGO</u> <u>IG^h1 (LC) (Excluded in the review)</u> 2 AN ^j sessions, PN ^k hospital visit and regular phone calls, optional PN ^k home visit through 3 months or until weaned, nursing bras and breast pumps as needed <u>IG^h2 (EP):</u> Prompts in the form of 2-3 brief questions appeared in the electronic record during 5 AN ^j visits to remind providers to ask and clarify about breastfeeding <u>IG^h3(Excluded in the review)</u> LC + EP <u>CGⁱ:</u> No explicit BF ^d promotion or support, IBCLC ^m at hospitals | <u>LC:</u> IBCLC ^m <u>EP:</u> Health care providers | ABF ^f and EBF ^e at 1, 3 and 6 months PP ^l |
| Mattar, 2007 ⁴⁷ | Low-risk pregnant women, ≥ 36 weeks GA ^c , singleton pregnancy, no contraindication to vaginal delivery | Singapore | RCT ^a | Total: 401 IG ^h 1: 123 IG ^h 2: 132 CG ⁱ : 146 | <u>IG^h1</u> BF ^d booklet + video + individual coaching <u>IG^h2</u> BF ^d booklet + video <u>CGⁱ</u> Standard care | Lactation counselor | EBF ^e and PBF ^g at 2 weeks, 6 weeks, 3 months and 6 months PP ^l |

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------------------|
| Schlickau, 2005 ³⁴ | Primiparas, immigrant Hispanic women, 32-36 weeks GA ^c | US | RCT ^a | Total: 86 IG ^h : 44 CG ⁱ : 42 | <u>IG^h</u> One-to-one AN ^j BF ^d education + standard care <u>CGⁱ</u> Standard care + BF ^d handouts | Nurse | Mean difference in ABF ^f at 6-7 weeks PP ^l |
| Serwint, 1996 ³³ | Primiparas, ≤28 weeks GA ^c , not yet selected a pediatrician and willing to accept assigned pediatrician as child's future doctor, if twins delivered, only twin A included | US | RCT ^a | Total: 156 IG ^h : 81 CG ⁱ : 75 | <u>IG^h</u> 1 AN ^j + PN ^k pediatric visits <u>CGⁱ</u> PN ^k pediatric visits only | Pediatrician | ABF ^f at 4 weeks and 2 months PP ^l |
| Su, 2007 ⁴⁶ | Healthy pregnant women, >34 weeks GA ^c , intend to BF ^d , singleton pregnancy | Singapore | RCT ^a | Total: 450 IG ^h 1: 150 IG ^h 2: 149 CG ⁱ : 151 | <u>IG^h1</u> Video + 1 one-to-one AN ^j lactation counseling+ printed guide + standard care <u>IG^h2 (Excluded in the review)</u> 2 sessions PN ^k lactation support + printed guide + standard care <u>CGⁱ</u> Standard care + optional PN ^k visit by IBCLC ^m | IBCLC ^m | EBF ^e and ABF ^f at 2 weeks, 6 weeks, 3 months and 6 months PP ^l |
| Intervention that contains both individual and group components | | | | | | | |

Table 1. Characteristics of relevant studies

| Study | Participants | Place of Origin | Design | Sample Size | Interventions | Conducted by | Outcomes of Interest |
|----------------------------|-------------------------------------------------------------|------------------------|------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------|
| Kistin, 1990 ³² | Black pregnant women, born in US, <24 weeks GA ^c | US | RCT ^a | Total:159 IG ^h 1: 38 IG ^h 2: 36 CG ⁱ : 56 | <u>IG^h1</u> BF ^d class + standard care <u>IG^h2</u> One-to-one contact + standard care <u>CGⁱ</u> Standard care | Pediatrician/ nurse practitioner | ABF ^f ≤ 2 weeks, ≤ 6 weeks and ≤ 12 weeks PP ^l |

Note: ^aRCT= randomized controlled trial, ^bQES= quasi-experimental study, ^cGA= gestational age, ^dBF= breastfeed(ing), ^eEBF= exclusive breastfeeding, ^fABF= any breastfeeding, ^gPBF= predominant breastfeeding, ^hIG= intervention group, ⁱCG= control group, ^jAN= antenatal, ^kPN= postnatal, ^lPP= postpartum, ^mIBCLC= International Board Certified Lactation Consultant

Table 2. Effectiveness of antenatal group and individual education

| Format of intervention | Studies | Results with significant effect | Result with non-significant effect |
|---------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AN ⁿ Group Education Alone vs. Standard Care | Duffy, 1997 ³⁹ | Full BF ^a at 6W ^e : 32/35 (46%) vs. 10/35 (14%); P ^o <0.001 | EBF ^b at 6M ^f : IG ^m 1: OR ^h 1.20, 95% CI ^l 0.67-2.18 IG ^m 2: OR ^h 1.17, 95% CI ^l 0.66-2.13 ABF ^c at 6M ^f : IG ^m 1: aOR ⁱ 1.26, 95% CI ^l 0.88-1.79 IG ^m 2: aOR ⁱ 1.03, 95% CI ^l 0.73-1.46 ABF ^c ≤2W ^e : 12/38 (32%) vs. 10/56 (18%); p ^o >0.05 ABF ^c ≤6W ^e : 8/38 (21%) vs. 8/56 (14%); p ^o >0.05 ABF ^c at 6W ^e : OR ^h 1.74, 95% CI ^l 0.87-3.46 EBF ^b at 6W ^e : OR ^h 1.56, 95% CI ^l 0.80-3.06 |
| | Forster, 2004 ⁴⁰ | | |
| | Kistin, 1990 ³² | ABF ^c ≤12W ^e : 6/38 (15%) vs. 2/56 (4%); p ^o <0.05 | |
| | Pugin, 1996 ⁴⁹ | Full BF ^a at 6M ^f : 47/59 (80%) vs. 235/363 (65%); p ^o =0.0026 | |
| | Tanner-Smith, 2013 ³⁸ | | |
| AN ⁿ Group Education + Educational Materials vs. Standard Care | Hill, 1987 ³⁵ | | ABF ^c ≥6W ^e : 12/31 (39%) vs. 10/33 (30%); p ^o >0.05 EBF ^b at 2W ^e : 81/107 (76%) vs. 66/89 (74%) EBF ^b at 3M ^f : 61/101 (60%) vs. 47/84 (56%) EBF ^b at 6M ^f : 29/96 (30%) vs. 22/82 (27%) ABF ^c at 2W ^e : 100/107 (93%) vs. 82/89 (92%) ABF ^c at 3M ^f : 82/101 (81%) vs. 64/84 (76%) ABF ^c at 6M ^f : 68/96 (71%) vs. 53/82 (65%) No significant difference between groups |
| | Kluka, 2004 ⁴³ | | |

Table 2. Effectiveness of antenatal group and individual education

| Format of intervention | Studies | Results with significant effect | Result with non-significant effect |
|----------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Kronborg, 2012 ⁴⁸ | | Full BF ^a at 1Y ^g : HR ^j 0.99, 95% CI ^l 0.87-1.12 ABF ^c at 6W ^e : 503/587 (94%) vs. 478/575 (91%); p ^o =0.13 ABF ^c at 1Y ^g : HR ^j 0.96, 95% CI ^l 0.84-1.09 |
| | Lavender, 2005 ⁵⁰ | | ABF ^c at 2W ^e : 444/644 (69%) vs. 389/605 (64%) ABF ^c at 4W ^e : 380/644 (59%) vs. 343/605 (57%) ABF ^c at 6W ^e : 332/644 (52%) vs. 297/605 (49%) ABF ^c at 4M ^f : 202/644 (31%) vs. 192/605 (32%) ABF ^c at 6M ^f : 140/644 (22%) vs. 138/605 (23%) ABF ^c at 1Y ^g : 60/644 (9%) vs. 61/605 (10%) No significant difference between groups |
| | Noel-Weiss, 2006 ⁴⁴ | | EBF ^b at 2M ^f : 34/47 (72%) vs. 29/45 (65%) ABF ^c at 2M ^f : 40/47 (85%) vs. 35/45 (77%) P ^o =0.302 |
| | Rossiter, 1994 ⁴¹ | ABF ^c at 4W ^e : 52/104 (50%) vs. 19/74 (25.6%); p ^o =0.001 | ABF ^c at 6M ^f : 26/101 (25.7%) vs. 12/74 (16.2%); p ^o =0.185 |
| AN ⁿ Group Education + Educational Materials + Incentives vs. Standard Care | Finch, 2002 ³⁶ | | Median duration: 12W ^e vs. 6W ^e ; P ^o =0.32 |

Table 2. Effectiveness of antenatal group and individual education

| Format of intervention | Studies | Results with significant effect | Result with non-significant effect |
|-------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AN ⁿ Individual Education Alone vs. Standard Care | Bonuck, 2014 ³⁷ | | EBF ^b at 1M ^f : OR ^h 0.78, 95% CI ^l 0.31-1.96 EBF ^b at 3M ^f : OR ^h 1.64, 95% CI ^l 0.34-15.75 EBF ^b at 6M ^f : OR ^h 1.31, 95% CI ^l 0.13-65.36 ABF ^c at 1M ^f : OR ^h 1.60, 95% CI ^l 0.92-2.78 ABF ^c at 3M ^f : OR ^h 1.31, 95% CI ^l 0.77-2.26 ABF ^c at 6M ^f : OR ^h 1.33, 95% CI ^l 0.74-2.39 |
| | Kistin, 1990 ³² | ABF ^c ≤ 2W ^e : 13/36 (36%) vs. 10/56 (18%); p ^o < 0.05 | ABF ^c ≤ 6W ^e : 8/36 (22%) vs. 8/56 (14%); p ^o > 0.05 ABF ^c ≤ 3M ^f : 2/36 (4%) vs. 2/56 (4%); p ^o > 0.05 |
| | Schlickau, 2005 ³⁴ | Mean duration at 42 days: 32 days vs. 12 days; p ^o < 0.01 | |
| | Serwint, 1996 ³³ | | ABF ^c at 4W ^e : 14/74 (19%) vs. 10/70 (14%); p ^o = 0.82 ABF ^c at 2M ^f : 8/74 (11%) vs. 6/70 (9%); p ^o = 0.98 |
| AN Individual Education + Educational Materials vs. Standard Care | Su, 2007 ⁴⁶ | EBF ^b at 6W ^e : RR ^k 1.73, 95% CI ^l 1.04-2.90 EBF ^b at 3M ^f : RR ^k 1.92, 95% CI ^l 1.07-3.48 EBF ^b at 6M ^f : RR ^k 2.16, 95% CI ^l 1.05-4.43 | EBF ^b at 2W ^e : RR ^k 1.32, 95% CI ^l 0.80-2.15 ABF ^c at 2W ^e : RR ^k 1.02, 95% CI ^l 0.79-1.20 ABF ^c at 6W ^e : RR ^k 1.03, 95% CI ^l 0.89-1.20 ABF ^c at 3M ^f : RR ^k 1.19, 95% CI ^l 0.85-1.66 ABF ^c at 6M ^f : RR ^k 1.25, 95% CI ^l 0.83-1.87 |
| | Mattar, 2007 ⁴⁷ | EBF ^b + PBF ^d at 3M ^f : aOR ⁱ 2.6, 95% CI ^l 1.2-5.4 | EBF ^b + PBF ^d at 2W ^e : OR ^h 1.6, 95% CI ^l 0.6-4.6 EBF ^b + PBF ^d at 6W ^e : OR ^h 1.7, 95% CI ^l 0.9-3.1 EBF ^b + PBF ^d at 6M ^f : aOR ⁱ 2.4, 95% CI ^l 1.0-5.7 |

Table 2. Effectiveness of antenatal group and individual education

| Format of intervention | Studies | Results with significant effect | Result with non-significant effect |
|------------------------------------------|-----------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nurse-Led Class vs. Peer-Led Class | Rempel, 2012 ⁴⁵ | | EBF ^b at 4W ^e : 19/37 (51%) vs. 23/38 (61%) EBF ^b at 6M ^f : 0/35 (0%) vs. 2/31 (6%) ABF ^c at 4W ^e : 26/37 (70%) vs. 32/38 (84%) ABF ^c at 6M ^f : 18/35 (49%) vs. 19/31 (61%) No significant difference between groups |
| | Sheehan, 1999 ⁴² | | Full BF ^a at 2M ^f : 66/86 (77%) vs. 49/68 (72%) Full BF ^a at 3M ^f : 56/86 (65%) vs. 42/68 (62%) Full BF ^a at 6M ^f : 2/86 (3%) vs. 1/68 (2%) ABF ^c at 2M ^f : 75/86 (87%) vs. 56/68 (82%) ABF ^c at 3M ^f : 73/86 (75%) vs. 51/68 (75%) ABF ^c at 6M ^f : 56/86 (66%) vs. 43/68 (64%) No significant difference between groups |

Note: ^aBF= breastfeeding, ^bEBF= exclusive breastfeeding, ^cABF= any breastfeeding, ^dPBF= predominant breastfeeding, ^eW= weeks, ^fM= months, ^gY= year, ^hOR= odds ratio, ⁱaOR= adjusted odds ratio, ^jHR= hazard ratio, ^kRR= risk ratio, ^lCI= confidence interval, ^mIG= intervention group, ⁿAN=antenatal, ^op=P-value