Routledge
Taylor & Francis Group

Health Psychology Review

ISSN: 1743-7199 (Print) 1743-7202 (Online) Journal homepage: https://www.tandfonline.com/loi/rhpr20

A systematic review and meta-analysis of interventions incorporating behaviour change techniques to promote breastfeeding among postpartum women

Angelos P. Kassianos, Emma Ward, Antonio Rojas-Garcia, Allison Kurti, Fiona C. Mitchell, Dian Nostikasari, Jamie Payton, Julian Pascal-Saadi, Claire Adams Spears & Caitlin Notley

To cite this article: Angelos P. Kassianos, Emma Ward, Antonio Rojas-Garcia, Allison Kurti, Fiona C. Mitchell, Dian Nostikasari, Jamie Payton, Julian Pascal-Saadi, Claire Adams Spears & Caitlin Notley (2019): A systematic review and meta-analysis of interventions incorporating behaviour change techniques to promote breastfeeding among postpartum women, Health Psychology Review

To link to this article: https://doi.org/10.1080/17437199.2019.1618724

Accepted author version posted online: 22 May 2019.

A systematic review and meta-analysis of interventions incorporating behaviour change techniques to promote breastfeeding among postpartum women

Angelos P. Kassianos [a*] 0000-0001-6428-2623, Emma Ward [b] 0000-0002-7579-3215, Antonio Rojas-Garcia [a, c] 0000-0002-7792-4311, Allison Kurti [d], Fiona C. Mitchell [e], Dian Nostikasari [f], Jamie Payton [g], Julian Pascal-Saadi [a], Claire Adams Spears [h], Caitlin Notley [b] 0000-0003-0876-3304

[a] Department of Applied Health Research, UCL, London, UK, [b] Norwich Medical School, University of East Anglia, Norwich, UK, [c] NIHR CLAHRC North Thames, London, UK , [d] Department of Psychiatry and Psychological Science, University of Vermont, Vermont, USA, [e] Psychological Sciences and Health, University of Strathclyde, Glasgow, UK, [f] Kinder Institute for Urban Research, Rice University, Houston, USA, [g] Department of Computer and Information Sciences, Temple University, Philadelphia, USA, [h] Department of Health Policy and Behavioral Sciences, Georgia State University School of Public Health, Atlanta, GA, USA

[*] University College London, Department of Applied Health Research, 1-19 Torrington Place, London WC1E 7HB angelos.kassianos@ucl.ac.uk 0044 20 7679 3291

This work was supported by a Cancer Research UK Population Research Committee - BUPA Foundation Fund - International Innovation Grant (C54889/A25592). ARG was supported by the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care North Thames at Bart's Health NHS Trust (NIHR CLAHRC North Thames). CAS was supported by grant number K23AT008442 from the National Center for Complementary

and Integrative Health (NIH/NCCIH). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
We would like to thank Simon Coates (UCL Librarian) for helping with initial searches. We would also like to thank Hannah Bains (UK Health Visitor and International Board Certified Lactation Consultant) and Vicki Rich (Vermont Breastfeeding Consultant and Doula) for their comments on the manuscript.

Declaration of interest statement

No potential conflict of interest was reported by the authors.

A systematic review and meta-analysis of interventions incorporating behaviour change techniques to promote breastfeeding among postpartum women

Abstract

The benefits of exclusive breastfeeding are well documented, yet few women adhere to recommendations. This systematic review reports the Behaviour Change Techniques (BCTs) within interventions trialled internationally after pregnancy to promote exclusive and mixed breastfeeding as well as evidence of effectiveness. PsycINFO, EMBASE and MEDLINE databases were screened. Twenty-three (n = 23) studies met inclusion criteria. Three authors independently extracted data, coded interventions using the BCT v.1 taxonomy, and assessed study quality. There was a moderate significant effect of the interventions promoting exclusive breastfeeding up to four weeks postpartum (OR 1.77, [95% CI: 1.47-2.13]) but this effect slightly declined beyond thirteen weeks (OR 1.63, [95% CI: 1.07-2.47). Twenty-nine BCTs were identified within interventions. ‘Credible source’ and ‘instruction on how to perform the

behaviour' were the most prevalent and 'social support (unspecified)' contributed to the effectiveness of exclusive breastfeeding interventions five to eight weeks postpartum. The use of BCTs covering cognitive and behavioural aspects may help women develop coping mechanisms promoting exclusive breastfeeding. Further trials evaluating interventions are needed in countries with low breastfeeding rates such as the U.K. The use of program theory during intervention development and clear description of intervention components is recommended. This meta-analysis provides guidance for trials evaluating postpartum breastfeeding interventions and information on components for developing interventions.

Keywords: breastfeeding; postpartum women; post-natal women; behaviour change techniques; lactation

The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months following birth, with continued breastfeeding in addition to complementary foods for up to two years or more (World Health Organization, 2011). To promote this guideline, UNICEF has partnered with WHO for the 'Baby Friendly Initiative' (UNICEF, 2011) which aims to empower healthcare staff to initiate conversations with parents about implementing breastfeeding best practice standards. In the U.K., the Department of Health recommends the 'Baby Friendly Initiative' as the minimum standard (The National Institute for Health and Care Excellence, 2014). Women postpartum receive support from maternity care providers either in hospital or primary care who support and encourage breastfeeding in general and exclusive breastfeeding for at least 6 months. In the U.S.A., the American Academy of Paediatrics also recommends exclusive breastfeeding for six months, with additional breastfeeding and complementary foods for at least one year (Eidelman et al., 2012). Despite these recommendations and support mechanisms, exclusive breastfeeding continues to be a challenge for many women.

Health Benefits of Breastfeeding

Breastfeeding is associated with a multitude of health benefits for both infants and mothers (Dyson et al., 2006; Eidelman et al., 2012; Ip, Chung, Raman, Trikalinos, & Lau, 2009). For the infant, breastfeeding has been associated with reduced risk of respiratory and gastrointestinal tract infections (Chantry, Howard, & Auinger, 2006; Duijts, Jaddoe, Hofman, & Moll, 2010; Duijts, Ramadhani, & Moll, 2009), allergies (Greer, Sicherer, & Burks, 2008), and sudden infant death syndrome (Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011; Thompson et al., 2017). In many cases there is a dose-response relationship, with greater duration of breastfeeding conferring greater health benefits for the infant (Eidelman et al., 2012). Some evidence also suggests that breastfeeding protects against being overweight as well as obesity, and developing type 2 diabetes in childhood and later in life (Horta, Loret de Mola, & Victora, 2015; Jwa, Fujiwara, & Kondo, 2014; Owen, Martin, Whincup, Smith, & Cook, 2005; Yan, Liu, Zhu, Huang, & Wang, 2014).

Among mothers, breastfeeding is associated with lower risk of hypertension (Nguyen, Jin, & Ding, 2017), cardiovascular disease (Schwarz et al., 2009), and type 2 diabetes (Aune, Norat, Romundstad, & Vatten, 2014; Schwarz et al., 2010). A recent systematic review indicates that breastfeeding for more than twelve months is associated with reduced risk of breast cancer and ovarian cancer (Chowdhury et al., 2015). Furthermore, for every one month of breastfeeding the lower the odds of ovarian cancer (Feng, Chen, & Shen, 2014; Luan et al., 2013).

Breastfeeding Rates

Breastfeeding for twelve months or more in high-income countries is lower than 20%, with the U.K. having the lowest rates at less than one percent (Victora et al., 2016). Previous data from 2010 indicate that the rate of initial breastfeeding in the U.K. on average was 81%.

However, a survey in 2012 showed that the rate of exclusive breastfeeding at birth was even lower at 69% (McAndrew et al., 2012). Rates of breastfeeding in the U.K. at six to eight weeks postpartum drops to 43.7% (Public Health England, 2018), and by six months only 34% of mothers report breastfeeding and only 1% report exclusive breastfeeding. Based on U.S.A. 2016 data, 81% of American mothers who gave birth to infants in 2013 reported ever breastfeeding (Center for Disease Prevention and Control, 2016). About half (52%) reported any breastfeeding and 22% reported exclusive breastfeeding at six months. Thus, very few mothers adhere to the WHO and national recommendations.

Overall, the prevalence of exclusive breastfeeding in high-income countries (<20%) is lower than developing countries in sub-Saharan Africa, south Asia and Latin America (<37%) (Victora et al., 2016). Despite evidence indicating numerous benefits of breastfeeding on maternal and infant health, and although most infants in developed countries like the U.S.A. and U.K. receive at least some breastfeeding, the majority of mothers in these countries do not adhere to the recommendation of exclusive breastfeeding for six months, with important cultural variation in rates.

Barriers to and Facilitators of Breastfeeding

Evidence points to a range of physical, psychological and social barriers to breastfeeding including birth complications and pain, social stigma, the responsibility being solely on the mother, and difficulty estimating the quantity of milk the baby is receiving (Dennis, 2002; Hill, 2000; Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005). Partner disapproval of breastfeeding has also been identified as a key barrier (Dennis, 2002; Scott & Binns, 1999), as well as uncertainty about what to expect with breastfeeding (Moore & Coty, 2006).

On the other hand, greater social support, more positive attitudes towards breastfeeding, and higher levels of breastfeeding self-efficacy are positively associated with breastfeeding duration (Moore & Coty, 2006; O'Campo, Faden, Gielen, & Wang, 1992). For example, partner or mother support has been shown to facilitate breastfeeding (Dennis, 2002; Hill, 2000). Evidence also suggests that mothers with higher levels of educational attainment are more likely to breastfeed in both the U.S.A. (Doyle & Kelleher, 2010; Tarrant, 2003) and U.K. (McMillan et al., 2009).

Support from healthcare professionals that includes encouragement combined with practical training and demonstration are effective approaches promoting breastfeeding (Hannula, Kaunonen, & Tarkka, 2008). The role of midwives is particularly important especially for multi-ethnic communities (Loiselle, Semenic, Côté, Lapointe, & Gendron, 2016). On the other hand, professionals also need education and organisational support to promote breastfeeding so that peer support and education is combined with professional support to promote breastfeeding benefits (Bibbins-Domingo et al., 2016).

Parental lack of knowledge can also prevent new mothers from breastfeeding. Parents who have breastfed their children are more knowledgeable about the health benefits of breastfeeding compared to parents who fed their children formula (Shaker, Scott, & Reid, 2004). Evidence suggests that a woman's decision to breastfeed can be influenced by her mother's choice of feeding method. Indeed, those who were breastfed themselves are likely to hold more positive attitudes and intentions to breastfeed compared to individuals who were not (Earle, 2000). Therefore, it is not surprising that improving parents' knowledge about the benefits of breastfeeding has been found to significantly increase the likelihood of breastfeeding (Susin et al., 1999).

Several studies have also explored the types of beliefs that can serve as facilitators of breastfeeding. These include beliefs that breastfeeding is more natural than bottle feeding, promotes improved infant health, facilitates maternal-infant bonding, is low cost, has benefits both for the mother and the baby, and is convenient and enjoyable (Dennis, 2002; Khoury et al., 2005; Moore & Coty, 2006).

Behaviour Change and Techniques in Breastfeeding Interventions

Interventions that are developed using a recognised theoretical underpinning, such as the Behaviour Change Wheel (Michie, van Stralen, & West, 2011) are generally shown to be more effective than non-theory-based interventions, as they are more likely to target measurable determinants of behaviour (Craig et al., 2008). In general, theory-driven interventions have been shown to have greater effectiveness for increasing women's decision to breastfeed, and are more clearly defined and easier to evaluate relative to interventions not derived from theory (Dodgson, Henly, Duckett, & Tarrant, 2003; Giles et al., 2014).

Behaviour Change Techniques (BCTs) refer to those components of an intervention that are designed to change behaviour. They form the smallest and most active parts of any intervention and may be used alone or in combination with other BCTs (Michie et al., 2011; National Institute for Health and Care Excellence, 2014). The technique must also meet specified criteria so that it can be identified, observed, delivered, and reliably replicated.

Certain BCTs may be more appropriate and effective for promoting specific health behaviours. For example, self-monitoring is one of the most effective BCTs for physical activity behaviour (French, Olander, Chisholm, & Mc Sharry, 2014), but may be less useful for breastfeeding. Self-efficacy as a determinant of breastfeeding attitudes and intentions may be a less effective technique for women who have never breastfed than for women who have

breastfed previously (Giles et al., 2014). To date there is no evidence to describe the BCTs that have been delivered within postpartum breastfeeding interventions for women to inform research, policy-making, and provide meaningful theoretical comparisons with BCTs used in other health behaviour interventions. Thus, a comprehensive review identifying BCTs used in promoting breastfeeding would make a substantial contribution to existing literature and inform future intervention development.

Aims of the Present Study

The aims of this systematic review are to (a) describe the published evidence of interventions aiming to promote mixed and exclusive breastfeeding among postpartum women in terms of their characteristics (e.g. country, use of theory etc.), (b) identify and report the BCTs used in these interventions, and (c) investigate the effectiveness of interventions aiming to promote exclusive breastfeeding among postpartum women at different time intervals postpartum.

There is a weak association between breastfeeding intentions that constitute that target of interventions during pregnancy and breastfeeding outcomes postpartum (Wambach, 1997). This calls for efforts to examine breastfeeding interventions after delivery (Ahluwalia, Morrow and Hsia, 2005). Previous efforts to summarise the effectiveness of breastfeeding interventions include both those initiated during pregnancy and postpartum (Fairbank et al., 2000). This is the first review focusing on interventions initiated postpartum and using an established framework (BCT) to establish intervention components and inform future intervention design and delivery. Moreover, reviewing the effectiveness of breastfeeding interventions at different time intervals will provide useful information on the sustainability of available interventions as previous

evidence suggest that the time period the intervention is initiated can be potentially important (Hannula, Kaunonen and Tarkka, 2008).

Methods

PRISMA guidelines were followed throughout the review process (Moher, Liberati, Tetzlaff, & Altman, 2009). The review was registered with PROSPERO (registration number: CRD42019119512). The data that support the findings of this study are available in Open Science Framework (OSF) in https://osf.io/2uzkf/, reference number (DOI 10.17605/OSF.IO/2UZKF).

Search Strategy and Inclusion/Exclusion Criteria

Peer-reviewed studies including breastfeeding interventions were examined by searching electronic databases (PsycINFO, EMBASE and MEDLINE). Search terms were used for postpartum ('postpartum', 'post-partum', 'puerperium', 'postpartum period', 'postnatal') and breastfeeding ('breastfeeding', 'breast-feeding', 'breast feeding', 'breast-feeding duration', 'lactation', 'breast milk', 'human milk', 'continued breastfeeding', 'exclusive breastfeeding'). The search was conducted in July 2017 whilst the screening stages occurred between August and December 2017. The sample search strategy and PRISMA checklist are available in the Appendices.

Study Selection

The inclusion criteria were:

- Population: Women in the postpartum period.
- Interventions: Any type of intervention that aims to promote breastfeeding either exclusively or in combination with other forms of feeding the infant. Interventions should

be initiated after giving birth because we are interested in mechanisms of interventions helping women to actually perform and not only consider breastfeeding.

- Comparisons: All types of comparison groups were included.
- Outcomes: The primary outcome was 'exclusive breastfeeding' rates as previously defined (World Health Organization, 2011). Exclusive breastfeeding was defined as feeding the infant with breast milk only. The secondary outcome was 'mixed breastfeeding' defined as feeding the infant with breast milk in combination with bottle-feeding. The rates were calculated as the number of women in the intervention and control groups that were per exclusively and mixed breastfeeding at different time points postpartum.
- Study design: Studies should have at least one intervention and one control group with pre-post intervention data. Both randomized and non-randomized trials were eligible.

Only studies available in English were included for pragmatic reasons.

The exclusion criteria for studies were those:

- Initiated during pregnancy (rather than postpartum).
- Having a qualitative, cross-sectional research design or longitudinal design with no control group.
- Any non-peer reviewed publications.

Two authors screened all titles against the inclusion and exclusion criteria. The abstracts and full-text were screened by three authors. Each reviewer checked 10% of the other reviewers' screening to ensure consistency. There was substantial agreement (McHugh 2012) between

coders during abstract (IRR = 0.72) and full text (IRR = 0.71) screening and any discrepancies were resolved through discussion.

Data Extraction

Three authors used a proforma to extract data from the included studies to spreadsheets. For each study, the study information, participant characteristics, and information about the intervention and main outcomes were extracted. The extracted study information included the study authors, title, location, study period, and research design. The extracted participant characteristics included the eligibility criteria, sample size, age, postpartum week at recruitment and at intervention, differences at baseline, and attrition. The extracted information about the intervention included intensity, duration, theoretical background, the person delivering the intervention and any associated training, follow-up time from recruitment, control procedures, and use of blinding. The extracted information on main outcomes included effectiveness data per interval (outcomes were examined separately according to the week they were assessed postpartum [birth-four weeks, five–eight weeks, nine–12 weeks, and ≥ 13 weeks]). All studies were narratively synthesized to identify common themes and patterns.

Behaviour Change Technique (BCT) Coding

Following screening, the authors aimed to identify BCTs used in included studies as defined in the BCT v.1 taxonomy (Abraham & Michie, 2008; Michie et al., 2013). Three authors who had undertaken online training in the BCT taxonomy v1 (Michie et al., 2015) reviewed all included studies to identify and code the BCTs according to the original 93 hierarchical clustered BCTs (Michie et al., 2013). To distinguish BCTs identified in each intervention, each coder was requested to provide a confidence rating for each BCT. As a result, each BCT could be scored as '++' when present beyond all reasonable doubt and with clear evidence available, and '+' when

possibly present and with limited evidence available. Only BCTs in interventions that were directly relevant to breastfeeding as an outcome were coded. Where the publications provided information on the control group procedures, the same process was applied to identify any BCTs that were used in both the intervention and control groups. This information was used for sensitivity analyses. Each author coded 10% of the other authors' codes and any discrepancies were discussed in a consensus meeting. There was a moderate inter-rater reliability (McHugh, 2012) between coders (IRR = 0.66) and discrepancies were resolved in a consensus meeting.

Meta-Analysis Strategy

Exclusive breastfeeding rates were the primary outcome in meta-analyses that were conducted to estimate effectiveness of interventions at the four intervals (birth-four weeks, five–eight weeks, nine–12 weeks, and ≥ 13 weeks). Sample size, number of cases, and non-cases of exclusive breastfeeding were extracted in both the intervention and the control groups. From the raw data available in the manuscripts (the number of women that were exclusively breastfeeding in intervention and control group) the Odds Ratios (OR) and 95% Confidence Intervals were calculated. The first follow-up from one study (Kang, Choi, & Ryu, 2008) was excluded from the meta-analysis of the first time interval (birth – four weeks postpartum) because participants were assessed just three days after baseline. This post-intervention time period assessment was substantially shorter than the other studies entered for meta-analysis of the first time-interval (see follow-up time-points in Table 1) and this could significantly increase the risk of bias in assessing the interval's effect size (Portela et al., 2015).

The DerSimonian and Laird method was used (DerSimonian & Laird, 1986) to conduct the random effects model meta-analysis, where log-odds ratio where calculated and transformed back into odds ratio. Heterogeneity was calculated using I^2 statistic, considering more than 50%

as substantial heterogeneity (Higgins & Green, 2011). Sources of heterogeneity were explored using the Galbraith chart. Publication bias was quantitatively evaluated through Egger and Harbord tests (Egger, Smith, Schneider, & Minder, 1997; Harbord, Egger, & Sterne, 2006). Sub-group analyses were also conducted to investigate the influence that location may have on the effectiveness of the interventions. When possible univariate meta-regression were performed in order to identify the BCTs that may have an impact on the pooled effect size and explore potential sources of heterogeneity. We performed meta-regression analysis to assess the impact of number of interventions' BCTs on each time intervals' effect size (please see Table 2 for number of BCTs per study). The meta-analyses were performed with STATA v.15 (StataCorp., 2017).

Methodological Robustness

The three reviewers also independently assessed the included studies' methodological quality. The Cochrane Collaboration tool for assessing quality and risk of bias was used for assessing the methodological quality of randomized controlled trials including those randomized at a cluster level (Higgins et al., 2011). For the non-randomized controlled trial the ROBINS-I tool was used (Sterne et al., 2016). Each reviewer assessed 10% of other reviewers' quality assessments and any discrepancies were resolved in a consensus meeting. There was moderate agreement between reviewers (IRR = 0.65).

In addition, the study quality was used for sensitivity analyses using studies with high or unclear risk of bias in more than half of the seven sources of bias (i.e. high or unclear risk in more than three sources). First, all studies were included in the meta-analysis and then studies with high or unclear risk of bias were removed to assess any differences in effect sizes. Additional sensitivity analyses were performed to identify differences in effect sizes in terms of

research design (with and without the non-RCT) and any control groups where participants were offered at least one BCT that was provided to the intervention group.

Results

Identification of Studies

A total of 2325 records were identified using the search strategy described and 1441 remained after duplicates were removed. After screening and excluding1335 titles as irrelevant, 106 abstracts were screened. During abstract screening 55 records were excluded with an additional 28 records excluded during full text screening. The final 23 records were included in the review. All stages of screening and the reasons for exclusion are described in Figure 1.

INSERT FIGURE 1 ABOUT HERE

Study Characteristics

Study characteristics are described in Table 1. The 23 included studies were published between 1987 and 2017 and included a total of 13.551 participants and with mean ages between 17.4 and 36 years old. One of the RCTs had more than two arms (Fu et al., 2014). These were analysed separately. Eighteen studies were conducted in industrialised countries (U.S.A., Denmark, South Korea, Australia, Turkey, Canada, and France) and five in non-industrialised countries (Malaysia, Hong Kong, Brazil, China and Jordan). The classification was based on the Organization for Economic Co-operation and Development (OECD) categorization (The Organisation for Economic Co-operation and Development (OECD), 2018) and categorized as OECD and non-OECD members countries. In the majority of studies (n = 21, 91%) mothers were recruited immediately postpartum (up to six weeks after giving birth).

INSERT TABLE 1 ABOUT HERE

Intervention Characteristics

The characteristics of the interventions are described in Table 2 and more detailed information on included studies are available in detail as Supplemental Material (Table A1). The majority of the interventions were delivered either face-to-face (n = 9, 39%) or using a combination of face-to-face and telephone delivery methods by voice (n = 9, 39%). Only two studies were delivered using telephone delivery alone (n = 2, 9%) or online delivery alone (n = 2, 9%), and only one intervention used a combination of the three delivery methods (4%).

The interventions lasted from one to 84 weeks with an average of 15 weeks (SD = 10.2). The majority were delivered by a healthcare professional (n = 18, 79%). There were four studies (17%) in which a peer delivered the interventions, and one that used both professionals and peer-supporters (4%). The peer supporters were not always defined (Aksu, Küçük, & Düzgün, 2011; Pugh et al., 2010) with one study specifying that these were women with experiential knowledge (Dennis, 2002). In approximately half of the studies (n = 12, 52%) there was some form of training reported for those who delivered the intervention. Only three studies (13%) clearly stated a theoretical framework that informed the design and delivery of the intervention: the Theory of Planned Behaviour (Gu, Zhu, Zhang, & Wan, 2016), Freire's (Freire, 1973) empowerment education philosophy (Kang et al., 2008) and 'psychosocial health education concepts' (Kronborg, Vaeth, Olsen, Iversen, & Harder, 2007).

INSERT TABLE 2 ABOUT HERE

BCTs' Coding and Evidence Synthesis

The BCTs in each study are outlined in detail as Supplemental Material (Table A2). There were 29 identified BCTs out of a total possible of 93 available in the taxonomy (31.2%).

The number of BCTs within a single intervention ranged from two to seventeen with an average of approximately five (M = 4.56) per intervention. For studies examining exclusive breastfeeding the average BCTs used were also approximately five (M = 4.93).

The most prevalent BCTs were 'credible source' (*n* = 17, 74%), 'instructions on how to perform the behaviour' (*n* = 13, 57%), 'unspecified social support' (*n* = 11, 48%), 'problem solving' (*n* = 9, 39%), 'demonstration of the behaviour' (*n* = 7, 30%), 'feedback on behaviour' (*n* = 7, 30%), 'information on social and environmental consequences' (*n* = 7, 30%) and 'behavioural practice/rehearsal' (*n* = 5, 22%). Out of these most prevalent BCTs, the ones which had lower confidence ratings from coders were 'credible source' (14 out of 17), 'social support (unspecified)' (8 out of 11), 'problem solving' (7 out of 9), and 'information about social and environmental consequences' (5 out of 7). This suggests difficulty in specifying the presence of these BCTs in breastfeeding interventions. Among studies that assess exclusive breastfeeding, 'credible source', 'social support (unspecified)', 'instructions on how to perform the behaviour', and 'problem solving' were the most prevalent at all time-intervals (Table 3).

INSERT TABLE 3 ABOUT HERE

Risk of Bias

Overall the methodological quality of included studies varied between different sources of bias. The quality assessment (Higgins et al., 2011) of the twenty-two RCTs included in the review is outlined in Figure 2. The studies generally performed well on randomization methods. The majority had low risk of random sequence bias (*n* = 17, 77%) and low risk because of allocation concealment (*n* = 13, 59%). Moreover, only one study had high risk on random sequence and two studies had high risk on allocation concealment. Also, the majority had low risk of attrition bias (*n* = 17, 77%). On the other hand, the included studies performed less well

on reporting and performance biases with ten studies having high risk of reporting bias (45%) and twelve having high risk of performance bias (55%). Overall eight studies (please see Figure 2) were considered as high or unclear risk of bias (assessed as having high or unclear bias in >3 sources of bias). The non-randomised controlled trial (Kang et al., 2008) quality was assessed using the ROBIN-I tool and generally performed well expect for confounding and selection bias where it performed moderately.

Furthermore, the included studies had several other specific methodological limitations, which must be taken into account when interpreting the results of the review. These include using small convenience samples (Albert & Heinrichs-Breen, 2011; Porteous, Kaufman, & Rush, 2000), sequential sampling (Albert & Heinrichs-Breen, 2011), no assessment of reasons for attrition (McLachlan et al., 2016; Tahir & Al-Sadat, 2013), the intervention not well described or defined (Pugh et al., 2010), hawthorn effect (McDonald, Henderson, Faulkner, Evans, & Hagan, 2010), shorter follow-up compared to the average (Porteous et al., 2000), and greater attrition in the control group relative to the intervention group (Gu et al., 2016). Finally, only twelve studies (52%) collected feasibility data for the intervention to allow further implementation.

INSERT FIGURE 2 ABOUT HERE

Effectiveness of the Interventions on Exclusive Breastfeeding

The results of the meta-analysis suggest a significant effect of the interventions at different time-points after birth on promoting exclusive breastfeeding (see Figures 3a, 3b, 3c and 3d for forest plot of effect sizes). The results are presented in the four intervals postpartum. Up to thirteen weeks postpartum, women enrolled in intervention conditions were twice as likely to continue with exclusive breastfeeding versus women enrolled in control conditions: up to four weeks (OR 1.94, [95% CI: 1.51 – 2.51]), five to eight weeks (OR 2.22, [95% CI: 1.48 – 3.34])

and nine to 12 weeks even if decreased compared to previous intervals remained high (OR 1.75, [95% CI: 1.23 – 2.48]). The effect beyond 13 weeks (OR 1.63, [95% CI = 1.07-2.47]) postpartum slightly decreased. Across the different time points, subgroup meta-analyses suggested that interventions conducted in OECD countries might be more effective than those conducted in non-OECD countries (see sub-total ORs in Figures 3a-3d).

INSERT FIGURES 3A-3D ABOUT HERE

Tests for heterogeneity indicated that there was no significant heterogeneity in the effect size for up to four weeks (I^2 = 0.3%). On the other hand, there was substantial heterogeneity in five to eight weeks (I^2 = 64.9%), nine to 12 weeks (I^2 = 60.5%) and beyond 13 weeks (I^2 = 80.3%). Between nine to 12 weeks the studies from non-OECD countries had low heterogeneity (I^2 = 0.0%) whilst beyond 13 weeks studies from OECD countries had low heterogeneity (I^2 = 21.2%). The impact of different factors, such as mode of delivery, length of intervention, intensity of intervention, and person delivering the intervention were not examined in sub-group analyses due to the small numbers of studies included in these sub-groups.

After carrying out univariate meta-regressions at the four time intervals, testing the impact of BCTs on the effect sizes, only 'social support (unspecified)' at five to eight weeks significantly improved the effectiveness of the interventions (z=2.23; p=.025) and reduced the heterogeneity to (I^2= 42.05%). Having said that, given the small number of studies in each analysis (<10) together with diversity of studies, outliers (e.g. Kang et al., 2008; Gu et al., 2016), and the fact that the control groups differ across studies, the meta-regression analyses need to be interpreted with caution. In addition, the number of BCTs was not statistically significant in any interval (birth to four weeks: z = 1.13; p= 0.260, five to eight weeks: z = 0.11; p = 0.911, nine to twelve weeks: z = 0.97; p = 0.333 and 13 weeks and beyond: z = 0.71; p = 0.476).

The sensitivity analysis revealed that there was only a small impact on the interventions' effectiveness when excluding studies with high or unclear risk of bias, the non-RCT and the studies where we identified that the control group includes a BCT present in the intervention group (Table 4).

INSERT TABLE 4 ABOUT HERE

Discussion

A total of 23 studies were identified in the review, with 10 studies assessing exclusive breastfeeding only, eight assessing mixed breastfeeding only, and five that assessed both. The majority of interventions were lengthy and had a face-to-face component, which was often combined with telephone support, in comparison to usual care which varied among studies but was usually much briefer, without follow up support. In total, 29 BCTs were identified in the included interventions. Meta-analyses showed that interventions were moderately effective in promoting exclusive breastfeeding, especially from birth to week thirteen postpartum. This together with recent findings on the importance of improving breastfeeding efficacy highlights the need of well-designed and theoretically informed breastfeeding interventions (Brockway, Benzies and Hayden, 2017). Interventions delivered in OECD countries seem to be more effective than those in non-OECD countries, but this preliminary finding requires further investigation. Factors like peer pressure to introduce other liquid or solid foods, emotional stress and lack of support in non-industrialised countries may explain this variation (Imdad, Yakoob, & Bhutta, 2011). There were also OECD countries with low breastfeeding rates like the UK (Public Health England, 2018) with no trial included in the review.

BCTs used in the interventions

The number of BCTs used in interventions did not impact effectiveness. The most prevalent BCTs identified were 'credible source' and 'instructions on how to perform the behaviour'. 'Social support (unspecified)' appeared to have an impact on exclusive breastfeeding interventions five to eight weeks postpartum. The majority of interventions were multi-component with five BCTs used on average in each intervention. This finding adds to previous evidence that increased breastfeeding is related to the emotional, tangible, and educational social support from peers, family, friends and professionals (Raj & Plichta, 1998).

On the other hand, for more targeted and one-to-one interventions there are additional BCTs that are used in current interventions. Specifically, these additional BCTs include 'problem solving', 'feedback and self-monitoring of behaviour', 'instructions on how to perform the behaviour', 'information about health, social and environmental consequences', 'demonstrating the behaviour', 'behavioural practice/rehearsal', and 'credible source'. Moreover, combining lay and peer-support with professional support can help disadvantaged women and women in non-industrialised countries to breastfeed (Dennis, 2002; Haroon, Das, Salam, Imdad, & Bhutta, 2013). This suggests that a combined intervention including partners with wider support networks may be a novel and effective way to promote breastfeeding.

There were also promising BCTs, which need to be further investigated, such as 'material incentive', and 'material reward'. For example, one study (Washio et al., 2017) demonstrated the effectiveness of financial incentives provided within one month after delivery for promoting exclusive breastfeeding. Payments were provided at each session and for up to six months if breastfeeding was demonstrated in front of an expert. Replicating this BCT in future interventions will help establish reliability of this effect in generalizing among different groups of mothers. Another approach that warrants further investigation is one whereby peers (usually

women with previous breastfeeding experience) visit new mothers at home to provide breastfeeding training within 3 days after child's birth (Aksu et al., 2011), or to deliver the intervention during hospital stay (Dennis, Hodnett, Gallop, & Chalmers, 2002), and facilitate both links to community support surrounding breastfeeding along with providing breastfeeding education (Pugh et al., 2010). Peer-support might be particularly important in low- and middle-income countries where, unlike industrialised countries, breastfeeding support is not necessarily provided as standard healthcare as evidenced elsewhere (Jolly et al., 2012).

Mode of Delivery

The majority of interventions were lengthy and had a face-to-face component, which was often combined with telephone support. In some studies that reported a positive effect on breastfeeding, mothers received face-to-face support in the hospital immediately after delivery followed by on-going support via telephone calls or home visits once they were discharged. These remote strategies may help sustain the effects of initially intensive face-to-face breastfeeding interventions. In addition, more advanced technology (e.g., smartphone apps, linkages between apps and electronic medical records) could be leveraged to provide sustained access to medical information and peer support surrounding breastfeeding. Primary care educational programs with an online or telephone support component may provide an optimal context to initiate and to sustain engagement in interventions to promote breastfeeding (Guise et al., 2003).

The interventions were mainly centred on individual behaviour and individually delivered, lacking a focus on cultural or social context that may impact mothers' decisions to breastfeed. For example, in one study (McLachlan et al., 2016), there were issues with staff availability in drop-in centres and thus contextual factors need to be taken into consideration in

intervention development. It is important to note that the present review could not attest to the impact of mode of delivery on interventions' effectiveness due to the small number of studies with different delivery modes.

Use of Theory

The lack of reporting a theoretical framework in the majority of studies is problematic in terms of providing a systematic approach to the design and implementation of the interventions, as well as selecting an appropriate methodology for evaluating the interventions' impact (French et al., 2012). Moreover, a theoretical framework can also provide empirical support on the selection of included BCTs in each intervention. On the other hand, there is a possibility that a theoretical framework was used but not reported. Future studies may choose to outline specifically what theoretical framework they used and how it informed the intervention design, as theory-driven interventions are thought to have greater effectiveness for increasing women's decision to breastfeed, and are more clearly defined and easier to evaluate relative to interventions not derived from theory (Dodgson et al., 2003; Giles et al., 2014).

Sustainability of Intervention Effect

A few studies reported a declining of the intervention effect over time (Ahmed, Roumani, Szucs, Zhang, & King, 2016; Aksu et al., 2011; Frank, Wirtz, Sorenson, & Heeren, 1987; Gu et al., 2016; Kang et al., 2008; Washio et al., 2017). Similarly, this meta-analysis revealed weaker intervention effects on exclusive breastfeeding beyond thirteen weeks postpartum. The decline of effect may reflect the fact that significant differences in breastfeeding are seen early on when the intervention is most intensive and with regular and frequent social support with a credible source (Pugh et al., 2010). Having said this it is important to consider that our meta-analysis does not suggest that the effect of intervention declines but rather that the differences between

intervention and control over time are minimised. In one study (Fu et al., 2014) there was some effect of the intervention (especially telephone support) at one and two months that did not remain significant at three months postpartum. Therefore, future interventions should devise strategies to maintain the intensity of intervention for a longer duration by incorporating for example more frequent follow-ups.

The larger effect early on also supports research suggesting that women may be more open to breastfeeding in the first weeks postpartum (Cohen, Brown, Rivera, & Dewey, 1999). This is consistent with a recent review that found breastfeeding interventions effective only within one month postpartum (Park and Ryu, 2017). Therefore, future interventions should be initiated during the first week postpartum if not earlier, which tends to be a time of adjustment but also where most women are able to focus on breastfeeding. Those initiating the intervention should also consider that women might be less likely to breastfeed if they miss the opportunity after baby's birth.

The decline of exclusive breastfeeding might be related to maternity leave, as return to work may constitute a barrier to breastfeeding. Previous evidence indicates a positive association between duration of breastfeeding and duration of leave and resumption of employment within the first year postpartum (Galtry, 2003). Thus, public health interventions at the workplace as well as substantial parental leave entitlement may both benefit breastfeeding rates (Ruhm, 2000).

Methodological Considerations, Strengths and Limitations of the Review

Since our focus is ultimately on development of interventions for the promotion of healthy behaviours in women postpartum, this review focused on studies that were initiated postpartum and therefore studies with interventions that were initiated during pregnancy were excluded. The decision to exclude studies initiated during pregnancy was a pragmatic choice

taken prior the review process, as studies initiated during pregnancy were widely heterogeneous, with a lack of postpartum follow up. Therefore, including interventions initiated during pregnancy would add to the heterogeneity of included interventions. Provided there are enough studies, a future complementary review may review interventions initiated during pregnancy and include postpartum follow-up. Moreover, breastfeeding was commonly assessed as self-reported by women and there is a potential limitation of inaccuracies.

The extraction of BCTs was challenging since the content and procedures of the interventions were not always clearly described which is also evidenced in the literature (Michie et al, 2009). This is reflected in the quality assessment in terms of the high risk of reporting bias in almost half of the included studies. Therefore, there is a risk of inconsistency in defining the BCTs based on the intervention descriptions in the included studies. For example, it was difficult to ascertain whether 'credible source' BCT was used, as it was not always clear whether the provider was deemed credible from the mothers' point of view. It was also difficult to specify whether BCTs like 'credible source', 'social support (unspecified)', 'information about social and environmental consequences' and 'problem solving' were present since their confidence rating were low. On the other hand, BCTs like 'feedback on the behaviour', 'instructions on how to perform the behaviour', 'behavioural practice/rehearsal', and 'demonstration of the behaviour' were more clearly described and thus had higher confidence ratings. There were also a small and heterogeneous number of studies per interval to perform meaningful meta-regression or sub-group analyses. Moreover, there were insufficient details regarding the BCTs to assess intervention efficacy in more detail.

As evidenced elsewhere (Michie et al, 2009) the published intervention descriptions did not always provide the level of detail required for BCT coding. In practice, more BCTs may have

been used than those reported. We did not contact study authors, but for pragmatic reasons did address this by following an inclusive approach in our coding. Thus, we included BCTs coded as probably present (+) in addition to those coded as definitely (++) present. In addition, a second coder provided 10% of data extraction for each intervention and a third reviewer was involved where necessary to resolve discrepancies in consensus meetings to ensure any relevant BCTs had been correctly identified.

There was high heterogeneity in studies when analysing the intervals beyond four weeks postpartum and therefore the results of the meta-analysis at those intervals should be interpreted with caution. There were three studies (Ahmed et al., 2016; Aksu et al., 2011; Gu et al., 2016) that mainly contributed towards higher heterogeneity in those three intervals. This heterogeneity can also be explained by the diverse population, i.e., women from diverse ethnic backgrounds who hold different beliefs about breastfeeding (Celi, Rich-Edwards, Richardson, Kleinman, & Gillman, 2005). Moreover, the methods of outcome assessment, intervention delivery, intensity and length were also diverse (see Supplemental Material for more information). One of the methodological issues that needs careful consideration in future research is the variation in both the primary outcome and the time-points these are assessed. On the other hand, heterogeneity was minimal when analysing studies in the first interval (birth – four weeks) and thus conclusions on the intervention effect immediately postpartum are reliable. The range of published dates may potentially add to heterogeneity of interventions since the WHO Baby Friendly Initiative was introduced in 1991. However only two of the included studies were published prior to 1991.

There were no unpublished studies included in this review and therefore we are aware of possible publication bias (J. P. Higgins & Green, 2011; Ioannidis & Trikalinos, 2007; Lau,

Ioannidis, Terrin, Schmid, & Olkin, 2006). It was planned to analyse publication bias through Egger and Harbord tests (Egger et al., 1997; Harbord et al., 2006). Nevertheless, as less than 10 studies were included in each interval meta-analysis these tests are not recommended given their lack of power. However, the search and screening for this review was rigorous to ensure that no relevant studies were missed and that we report on the majority of evidence regarding interventions for mixed and exclusive breastfeeding. In addition, in order to ensure that low quality studies were not having an impact on the effect sizes, a sensitivity analysis was conducted by removing those studies with high risk of bias and then comparing the results with the initial results.

Moreover, another limitation of this review is the initial moderate agreement between coders when coding the interventions' BCTs. However, the method used for identifying the BCTs was empirically developed and similar reviews found similar agreement rates of $k = 0.68$ (Olander et al., 2013). A series of consensus meetings took place to discuss discrepancies and in most cases disagreements were attributable to the unclear intervention descriptions in the included studies. We recognize however that a number of BCTs may have been misinterpreted and that contacting authors would be an important strategy for future review updates.

Finally, only three studies (Ahmed et al., 2016; Dennis et al., 2002; Tahir & Al-Sadat, 2013) reported on the proportion of women engaged in partial breastfeeding in the control group when assessing exclusive breastfeeding. This is problematic as knowledge about partial breastfeeding is helpful in interpreting the impact and effectiveness of the intervention. For example, when reporting that a number of women did not exclusively breastfeed in the control group, it is not clear whether these women were partially breastfeeding or not breastfeeding at all and how this compares to those in the intervention group. Moreover, the control procedures were

usually described as ‘standard care,’ ‘routine care,’ or ‘usual care’ and studies varied in how much detail was provided regarding procedures associated with the control group (see Table A1 in Supplemental Material for more information). Finally, we could not easily extract data from all included studies on important information that may impact breastfeeding like ethnicity and number of children. Researchers may consider assessing and reporting this information to help with interpreting their findings. If number of studies allows, future reviews may also provide evidence on the impact of cultural variation on interventions’ effectiveness.

Implications for Research and Practice

This review aimed to identify BCTs that could constitute components of effective interventions for promoting breastfeeding among postpartum women. Exclusive or mixed breastfeeding can be achieved through individual interventions that focus on educating, self-monitoring, and providing the necessary support for women to continue breastfeeding. Also, broader community- and societal-level interventions can be used to influence breastfeeding behaviour, such as mass media messages (Wakefield, Loken, & Hornik, 2010). Multifaceted approaches are needed to promote exclusive breastfeeding that target individuals and communities to promote relevant policies, such as the implementation of the WHO Baby Friendly initiative in practice (UNICEF, 2011).

There are a number of implications for research. Future studies should consider minimising the variation in both the primary outcome and the time points these are assessed. Only a few studies assessed exclusive breastfeeding at a time point beyond six months postpartum and mixed breastfeeding beyond twelve months postpartum in order to assess whether the interventions have any benefit according to the WHO guidelines (World Health Organization, 2011). It is recommended that future studies should include follow-up of at least

six months for exclusive breastfeeding and twelve months or longer for mixed breastfeeding. Future studies need to report on programme theory used during intervention development and clearly describe and define the core aspects of the intervention in order that BCTs, as the active ingredients of interventions can be clearly reviewed and replicated. Additionally, future studies should focus on the sustainability of the interventions so that these follow-ups are meaningful. The low risk of attrition bias in the majority of the included studies is promising in this respect.

In terms of the analysis of the BCTs in breastfeeding promotion, the inclusion of BCTs may lead to the development of complex interventions where several components at different levels can influence the outcomes of breastfeeding promotion programmes. More research in this area is required to determine the effectiveness of these interventions and identify the partial value of BCTs and their impact over the time. In addition, there is a methodological consideration from this review in that future BCT meta-analyses can take into consideration the limitations we identified when performing meta-regression analyses with BCTs as predictors of pooled effect size. These include number of studies, research design and outcome diversity, outliers with adequate methodological quality as well as heterogeneity of control group procedures. When having enough studies, future reviews or updates may consider recommendations in terms of coding levels of BCT application (absence, partial application, consistent application), acknowledging contextual and co-occurrence factors and coding whether BCTs occurred uniquely in the control group (de Bruin, Viechtbauer, Hospers, Schaalma, & Kok, 2009; de Bruin et al., 2010; Peters, De Bruin, & Crutzen, 2015).

An important analytic consideration from conducting this meta-analysis concerns the use of time postpartum as moderator of the BCTs' contribution to interventions' effectiveness. A limitation of attempting to use time postpartum and BCTs as moderators in one meta-regression

model is that some studies may have assessed breastfeeding at different time-points. As a result, such a meta-regression would violate the independence of sample since the same participants would be used in different time-intervals in the same analysis. Therefore, it is difficult to isolate the effect of BCTs from the effect of time postpartum in a meta-regression. Since this question is important we would suggest future researchers to collect primary longitudinal data and perform a time-series or survival analysis to examine the duration of time until BCTs become ineffective.

Conclusions

Considered together, the studies included in the present review indicate that interventions are moderately effective at promoting exclusive breastfeeding immediate postpartum but that this effect declines thirteen weeks onwards in comparison to previous intervals. This has explanatory value in understanding why adherence to WHO recommendation for exclusive breastfeeding for six months after birth is poor. Particularly, we identified no U.K. trials of breastfeeding interventions that were eligible for inclusion in our review, and it is noticeable that the U.K. has particularly low rates of exclusive or mixed breastfeeding. There is an urgent need for similar trials in the U.K. Overcoming barriers of delivering effective breastfeeding interventions in non-industrialised countries is also needed.

Furthermore, this review suggests that promoting exclusive breastfeeding among postpartum women might be easier through channels that enable peer and professional support. This adds to a recent review which found postnatal education and support effective at increasing breastfeeding rates without however being able to identify the components of the interventions (Meedya, Fernandez and Fahy, 2017). On the other hand, promoting exclusive breastfeeding may also require interventions that employ BCTs to target cognitive and behavioural aspects of how

to perform breastfeeding, relevant consequences, and developing coping mechanisms for dealing with difficulties.

References

Abbass-Dick, J., Stern, S. B., Nelson, L. E., Watson, W., & Dennis, C.-L. (2015). Coparenting breastfeeding support and exclusive breastfeeding: a randomized controlled trial. *Pediatrics*, *135*, 102–110. doi: 10.1542/peds.2014-1416

Abraham, C., & Michie, S. (2008). A taxonomy of behavior change techniques used in interventions. *Health Psychology*, *27*(3), 379.

Ahluwalia, I. B., Morrow, B., & Hsia, J. (2005). Why do women stop breastfeeding? Findings from the Pregnancy Risk Assessment and Monitoring System. *Pediatrics*, *116*(6), 1408-1412.

Ahmed, A. H., Roumani, A. M., Szucs, K., Zhang, L., & King, D. (2016). The effect of interactive web-based monitoring on breastfeeding exclusivity, intensity, and duration in healthy, term infants after hospital discharge. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *45*(2), 143–154.

Aksu, H., Küçük, M., & Düzgün, G. (2011). The effect of postnatal breastfeeding education/support offered at home 3 days after delivery on breastfeeding duration and knowledge: a randomized trial. *The Journal of Maternal-Fetal & Neonatal Medicine*, *24*(2), 354–361.

Albert, J., & Heinrichs-Breen, J. (2011). An evaluation of a breastfeeding privacy sign to prevent interruptions and promote successful breastfeeding. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *40*(3), 274–280.

Aune, D., Norat, T., Romundstad, P., & Vatten, L. J. (2014). Breastfeeding and the maternal risk of type 2 diabetes: A systematic review and dose–response meta-analysis of cohort studies. *Nutrition, Metabolism and Cardiovascular Diseases*, *24*(2), 107–115.

Bibbins-Domingo, K., Grossman, D. C., Curry, S. J., Davidson, K. W., Epling, J. W., García, F. A. R., Kemper, A.R., Krist, A.H., Kurth, A.E., Seth Landefeld, C., Mangione, C.M., Phillips, W.R., Phillips, M.G., Pignone, M. P. (2016). Primary Care Interventions to Support Breastfeeding: US Preventive Services Task Force Recommendation Statement. *JAMA*, *316*(16), 1688–1693. https://doi.org/10.1001/jama.2016.14697

Brockway, M., Benzies, K., & Hayden, K. A. (2017). Interventions to improve breastfeeding self-efficacy and resultant breastfeeding rates: A systematic review and meta-analysis. *Journal of Human Lactation*, *33*(3), 486-499.

Celi, A. C., Rich-Edwards, J. W., Richardson, M. K., Kleinman, K. P., & Gillman, M. W. (2005). Immigration, race/ethnicity, and social and economic factors as predictors of breastfeeding initiation. *Archives of Pediatrics & Adolescent Medicine*, *159*(3), 255–260.

Center for Disease Prevention and Control. (2016). *Breastfeeding report card: Progressing toward national breastfeeding goals*.

Chantry, C. J., Howard, C. R., & Auinger, P. (2006). Full Breastfeeding Duration and Associated Decrease in Respiratory Tract Infection in US Children. *Pediatrics*, *117*(2), 425–432. https://doi.org/10.1542/peds.2004-2283

Chowdhury, R., Sinha, B., Sankar, M. J., Taneja, S., Bhandari, N., Rollins, N., Bahl, R., Martines, J. (2015). Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatrica*, *104*(S467), 96–113.

Cohen, R. J., Brown, K. H., Rivera, L. L., & Dewey, K. G. (1999). Promoting exclusive breastfeeding for 4-6 months in Honduras: attitudes of mothers and barriers to compliance. *Journal of Human Lactation*, *15*(1), 9–18.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., Petticrew, M., & Medical Research Council Guidance. (2008). Developing and evaluating complex interventions: the new Medical Research Council guidance. *BMJ (Clinical Research Ed.)*, *337*, a1655.

de Bruin, M., Viechtbauer, W., Hospers, H. J., Schaalma, H. P., & Kok, G. (2009). Standard care quality determines treatment outcomes in control groups of HAART-adherence intervention studies: implications for the interpretation and comparison of intervention effects. *Health Psychology*, *28*(6), 668.

de Bruin, M., Viechtbauer, W., Schaalma, H. P., Kok, G., Abraham, C., & Hospers, H. J. (2010). Standard care impact on effects of highly active antiretroviral therapy adherence interventions: A meta-analysis of randomized controlled trials. *Archives of Internal Medicine*, *170*(3), 240–250.

Dennis, C.-L. (2002). Breastfeeding initiation and duration: a 1990-2000 literature review. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *31*(1), 12–32.

Dennis, C.-L., Hodnett, E., Gallop, R., & Chalmers, B. (2002). The effect of peer support on breast-feeding duration among primiparous women: a randomized controlled trial. *Canadian Medical Association Journal*, *166*(1), 21–28.

DerSimonian, R., & Laird, N. (1986). Meta-analysis in clinical trials. *Controlled Clinical Trials*, *7*(3), 177–188.

Dodgson, J. E., Henly, S. J., Duckett, L., & Tarrant, M. (2003). Theory of planned behavior-based models for breastfeeding duration among Hong Kong mothers. *Nursing Research*, *52*(3), 148–158.

Doyle, D., & Kelleher, C. (2010). A comparative analysis of breastfeeding practices in Ireland and Northern Ireland. *Irish Journal of Medical Science*, *179*, 444–445.

Duijts, L., Jaddoe, V. W., Hofman, A., & Moll, H. A. (2010). Prolonged and exclusive breastfeeding reduces the risk of infectious diseases in infancy. *Pediatrics*, peds–2008.

Duijts, L., Ramadhani, M. K., & Moll, H. A. (2009). Breastfeeding protects against infectious diseases during infancy in industrialized countries. A systematic review. *Maternal & Child Nutrition*, *5*(3), 199–210.

Dyson, L., Renfrew, M., McFadden, A., McCormick, F., Herbert, G., & Thomas, J. (2006). Promotion of breastfeeding initiation and duration. *Evidence into Practice Briefing. London: NICE*.

Earle, S. (2000). Why some women do not breast feed: bottle feeding and fathers' role. *Midwifery*, *16*(4), 323–330.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *Bmj*, *315*(7109), 629–634.

Eidelman, A. I., Schanler, R. J., Johnston, M., Landers, S., Noble, L., Szucs, K., & Viehmann, L. (2012). Breastfeeding and the use of human milk. *Pediatrics*, *129*(3), e827–e841.

Fairbank, L., O'meara, S., Renfrew, M. J., Woolridge, M., Sowden, A. J., & Lister-Sharp, D. (2000). A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding. *Health technology assessment (Winchester, England)*, *4*(25), 1-171.

Feng, L.-P., Chen, H.-L., & Shen, M.-Y. (2014). Breastfeeding and the Risk of Ovarian Cancer: A Meta-Analysis. *Journal of Midwifery & Women's Health*, *59*(4), 428–437.

Frank, D. A., Wirtz, S. J., Sorenson, J. R., & Heeren, T. (1987). Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. *Pediatrics*, *80*(6), 845–854.

Freire, P. (1973). *Education for critical consciousness* (Vol. 1). Bloomsbury Publishing.

French, D. P., Olander, E. K., Chisholm, A., & Mc Sharry, J. (2014). Which behaviour change techniques are most effective at increasing older adults' self-efficacy and physical activity behaviour? A systematic review. *Annals of Behavioral Medicine*, *48*(2), 225–234.

French, Green, S. E., O'Connor, D. A., McKenzie, J. E., Francis, J. J., Michie, S., Buchbinder, R., Schattner, P., Spike, N., Grimshaw, J. M. (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implementation Science*, *7*(1), 38.

Fu, I. C. Y., Fong, D. Y. T., Heys, M., Lee, I. L. Y., Sham, A., & Tarrant, M. (2014). Professional breastfeeding support for first-time mothers: a multicentre cluster randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, *121*(13), 1673–1683.

Galtry, J. (2003). The impact on breastfeeding of labour market policy and practice in Ireland, Sweden, and the USA. *Social Science & Medicine*, *57*(1), 167–177. https://doi.org/10.1016/S0277-9536(02)00372-6

Giles, M., McClenahan, C., Armour, C., Millar, S., Rae, G., Mallett, J., & Stewart-Knox, B. (2014). Evaluation of a theory of planned behaviour–based breastfeeding intervention in Northern Irish Schools using a randomized cluster design. *British Journal of Health Psychology*, *19*(1), 16–35.

Greer, F. R., Sicherer, S. H., & Burks, A. W. (2008). Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. *Pediatrics*, *121*(1), 183–191.

Gu, Y., Zhu, Y., Zhang, Z., & Wan, H. (2016). Effectiveness of a theory-based breastfeeding promotion intervention on exclusive breastfeeding in China: A randomised controlled trial. *Midwifery*, *42*, 93–99.

Guise, J.-M., Palda, V., Westhoff, C., Chan, B. K., Helfand, M., & Lieu, T. A. (2003). The effectiveness of primary care-based interventions to promote breastfeeding: systematic evidence review and meta-analysis for the US Preventive Services Task Force. *The Annals of Family Medicine*, *1*(2), 70–78.

Hannula, L., Kaunonen, M., & Tarkka, M.-T. (2008). A systematic review of professional support interventions for breastfeeding. *Journal of Clinical Nursing*, *17*(9), 1132–1143. https://doi.org/10.1111/j.1365-2702.2007.02239.x

Harbord, R. M., Egger, M., & Sterne, J. A. (2006). A modified test for small-study effects in meta-analyses of controlled trials with binary endpoints. *Statistics in Medicine*, *25*(20), 3443–3457.

Haroon, S., Das, J. K., Salam, R. A., Imdad, A., & Bhutta, Z. A. (2013). Breastfeeding promotion interventions and breastfeeding practices: a systematic review. *BMC Public Health*, *13*(3), S20.

Hauck, F. R., Thompson, J. M., Tanabe, K. O., Moon, R. Y., & Vennemann, M. M. (2011). Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. *Pediatrics*, peds–2010.

Higgins, J. P., & Green, S. (2011). *Cochrane handbook for systematic reviews of interventions* (Vol. 4). John Wiley & Sons.

Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., Savovic, J., Schulz, K.F., Weeks, L., Sterne, J. A. C. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*, *343*, d5928. https://doi.org/10.1136/bmj.d5928

Hill, P. D. (2000). Update on breastfeeding: Healthy people 2010 objectives. *MCN: The American Journal of Maternal/Child Nursing*, *25*(5), 248–251.

Horta, B. L., Loret de Mola, C., & Victora, C. G. (2015). Long-term consequences of breastfeeding on cholesterol, obesity, systolic blood pressure and type 2 diabetes: a systematic review and meta-analysis. *Acta Paediatrica*, *104*(S467), 30–37.

Imdad, A., Yakoob, M. Y., & Bhutta, Z. A. (2011). Effect of breastfeeding promotion interventions on breastfeeding rates, with special focus on developing countries. *BMC Public Health*, *11*(3), S24. https://doi.org/10.1186/1471-2458-11-S3-S24

Ioannidis, J. P., & Trikalinos, T. A. (2007). The appropriateness of asymmetry tests for publication bias in meta-analyses: a large survey. *Canadian Medical Association Journal*, *176*(8), 1091–1096.

Ip, S., Chung, M., Raman, G., Trikalinos, T. A., & Lau, J. (2009). A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. *Breastfeeding Medicine*, *4*(S1), S–17.

Jolly, K., Ingram, L., Khan, K. S., Deeks, J. J., Freemantle, N., & MacArthur, C. (2012). Systematic review of peer support for breastfeeding continuation: metaregression analysis of the effect of setting, intensity, and timing. *BMJ*, *344*, d8287. https://doi.org/10.1136/bmj.d8287

Jwa, S. C., Fujiwara, T., & Kondo, N. (2014). Latent protective effects of breastfeeding on late childhood overweight and obesity: a nationwide prospective study. *Obesity*, *22*(6), 1527–1537.

Kang, J. S., Choi, S. Y., & Ryu, E. J. (2008). Effects of a breastfeeding empowerment programme on Korean breastfeeding mothers: a quasi-experimental study. *International Journal of Nursing Studies*, *45*(1), 14–23.

Khoury, A. J., Moazzem, S. W., Jarjoura, C. M., Carothers, C., & Hinton, A. (2005). Breast-feeding initiation in low-income women: Role of attitudes, support, and perceived control. *Women's Health Issues*, *15*(2), 64–72.

Kronborg, H., Vaeth, M., Olsen, J., Iversen, L., & Harder, I. (2007). Effect of early postnatal breastfeeding support: a cluster-randomized community based trial. *Acta Paediatrica*, *96*(7), 1064–1070.

Lau, J., Ioannidis, J. P., Terrin, N., Schmid, C. H., & Olkin, I. (2006). Evidence based medicine: The case of the misleading funnel plot. *BMJ: British Medical Journal*, *333*(7568), 597.

Loiselle, C. G., Semenic, S. E., Côté, B., Lapointe, M., & Gendron, R. (2016). Impressions of Breastfeeding Information and Support Among First-Time Mothers Within a Multiethnic Community. *Canadian Journal of Nursing Research Archive*, *33*(3). Retrieved from http://cjnr.archive.mcgill.ca/article/view/1646

Luan, N.-N., Wu, Q.-J., Gong, T.-T., Vogtmann, E., Wang, Y.-L., & Lin, B. (2013). Breastfeeding and ovarian cancer risk: a meta-analysis of epidemiologic studies–. *The American Journal of Clinical Nutrition*, *98*(4), 1020–1031.

McAndrew, F., Thompson, J., Fellows, L., Large, A., Speed, M., & Renfrew, M. J. (2012). Infant feeding survey 2010. *Leeds: Health and Social Care Information Centre*.

McDonald, S. J., Henderson, J. J., Faulkner, S., Evans, S. F., & Hagan, R. (2010). Effect of an extended midwifery postnatal support programme on the duration of breast feeding: a randomised controlled trial. *Midwifery*, *26*(1), 88–100.

McHugh, M. L. (2012). Interrater reliability: the kappa statistic. *Biochemia medica*, *22*(3), 276-282.

McLachlan, H. L., Forster, D. A., Amir, L. H., Cullinane, M., Shafiei, T., Watson, L. F., Ridgway, L., Cramer, R.L., Small, R. (2016). Supporting breastfeeding In Local Communities (SILC) in Victoria, Australia: a cluster randomised controlled trial. *BMJ Open*, *6*(2), e008292.

McMillan, B., Conner, M., Green, J., Dyson, L., Renfrew, M., & Woolridge, M. (2009). Using an extended theory of planned behaviour to inform interventions aimed at increasing breastfeeding uptake in primiparas experiencing material deprivation. *British Journal of Health Psychology*, *14*(2), 379–403.

Meedya, S., Fernandez, R., & Fahy, K. (2017). Effect of educational and support interventions on long-term breastfeeding rates in primiparous women: a systematic review and meta-analysis. *JBI database of systematic reviews and implementation reports*, *15*(9), 2307-2332.

Michie S, Fixsen D, Grimshaw JM, Eccles MP. (2009). Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implementation Science, 40(4).*

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Eccles, M.P., Cane, J., Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered

techniques: building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *46*(1), 81–95. https://doi.org/10.1007/s12160-013-9486-6

Michie, van Stralen, M. M., & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, *6*, 42. https://doi.org/10.1186/1748-5908-6-42

Michie, Wood, C. E., Johnston, M., Abraham, C., Francis, J., & Hardeman, W. (2015). Behaviour change techniques: the development and evaluation of a taxonomic method for reporting and describing behaviour change interventions (a suite of five studies involving consensus methods, randomised controlled trials and analysis of qualitative data). *Health Technology Assessment*, *19*(99). https://doi.org/10.3310/hta19990

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264–269.

Moore, E. R., & Coty, M.-B. (2006). Prenatal and postpartum focus groups with primiparas: breastfeeding attitudes, support, barriers, self-efficacy, and intention. *Journal of Pediatric Health Care*, *20*(1), 35–46.

National Institute for Health and Care Excellence. (2014). *Behaviour change: individual approaches*. Retrieved from https://www.nice.org.uk/guidance/ph49

Nguyen, B., Jin, K., & Ding, D. (2017). Breastfeeding and maternal cardiovascular risk factors and outcomes: A systematic review. *PloS One*, *12*(11), e0187923.

O'Campo, P., Faden, R. R., Gielen, A. C., & Wang, M. C. (1992). Prenatal factors associated with breastfeeding duration: recommendations for prenatal interventions. *Birth*, *19*(4), 195–201.

Olander, E. K., Fletcher, H., Williams, S., Atkinson, L., Turner, A., & French, D. P. (2013). What are the most effective techniques in changing obese individuals' physical activity self-efficacy and behaviour: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 29.

Owen, C. G., Martin, R. M., Whincup, P. H., Smith, G. D., & Cook, D. G. (2005). Effect of infant feeding on the risk of obesity across the life course: a quantitative review of published evidence. *Pediatrics*, *115*(5), 1367–1377.

Park, S. H., & Ryu, S. (2017). Effects of Breastfeeding Interventions on Breastfeeding Rates at 1, 3 and 6 Months Postpartum: A Systematic Review and Meta-Analysis. *Journal of Korean Academy of Nursing*, *47*(6), 713-730.

Peters, G.-J. Y., De Bruin, M., & Crutzen, R. (2015). Everything should be as simple as possible, but no simpler: towards a protocol for accumulating evidence regarding the active content of health behaviour change interventions. *Health Psychology Review*, *9*(1), 1–14.

Portela, M. C., Pronovost, P. J., Woodcock, T., Carter, P., & Dixon-Woods, M. (2015). Republished: How to study improvement interventions: a brief overview of possible study types. *Postgraduate Medical Journal*, *91*(1076), 343-354.

Porteous, R., Kaufman, K., & Rush, J. (2000). The effect of individualized professional support on duration of breastfeeding: a randomized controlled trial. *Journal of Human Lactation*, *16*(4), 303–308.

Public Health England. (2018). Breastfeeding at 6 to 8 weeks after birth: annual data. Retrieved March 28, 2018, from https://www.gov.uk/government/statistics/breastfeeding-at-6-to-8-weeks-after-birth-annual-data

Pugh, L. C., Serwint, J. R., Frick, K. D., Nanda, J. P., Sharps, P. W., Spatz, D. L., & Milligan, R. A. (2010). A randomized controlled community-based trial to improve breastfeeding rates among urban low-income mothers. *Academic Pediatrics*, *10*(1), 14–20.

Raj, V. K., & Plichta, S. B. (1998). The role of social support in breastfeeding promotion: a literature review. *Journal of Human Lactation*, *14*(1), 41–45.

Ruhm, C. J. (2000). Parental leave and child health. *Journal of Health Economics*, *19*(6), 931–960.

Schwarz, E. B., Brown, J. S., Creasman, J. M., Stuebe, A., McClure, C. K., Van Den Eeden, S. K., & Thom, D. (2010). Lactation and maternal risk of type 2 diabetes: a population-based study. *The American Journal of Medicine*, *123*(9), 863–e1.

Schwarz, E. B., Ray, R. M., Stuebe, A. M., Allison, M. A., Ness, R. B., Freiberg, M. S., & Cauley, J. A. (2009). Duration of lactation and risk factors for maternal cardiovascular disease. *Obstetrics and Gynecology*, *113*(5), 974.

Scott, J. A., & Binns, C. W. (1999). Factors associated with the initiation and duration of breastfeeding: a review of the literature. *Breastfeeding Review: Professional Publication of the Nursing Mothers' Association of Australia*, *7*(1), 5–16.

Shaker, I., Scott, J. A., & Reid, M. (2004). Infant feeding attitudes of expectant parents: breastfeeding and formula feeding. *Journal of Advanced Nursing*, *45*(3), 260–268.

StataCorp. (2017). Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.

Sterne, J. A., Hernán, M. A., Reeves, B. C., Savović, J., Berkman, N. D., Viswanathan, M., Henry, D., Altman, D.G., Ansari, M.T., Boutron, I., Carpenter, J.R., Phelan, A-W., C., Churchill, R., Deeks, J.J., Hrobjartsson, A., Kirkham, J., Juni, P., Loke, Y.K., Pigott, T.D., Ramsay, C.R., Regidor, D., Rothstein, H.R., Sandhu, L., Santaguida, P.L., Schumemann, H.J., Shea, B., Shrier, I., Tugwell, P., Turner, L., Valentine, J.C., Waddington, H., Waters, E., Wells, G.A., Whiting, P.F., & Higgins, J.P.T.

(2016). ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *The BMJ*, *355*, i4919.

Susin, L. R., Giugliani, E. R., Kummer, S. C., Maciel, M., Simon, C., & Da Silveira, L. C. (1999). Does parental breastfeeding knowledge increase breastfeeding rates? *Birth*, *26*(3), 149–156.

Tahir, N. M., & Al-Sadat, N. (2013). Does telephone lactation counselling improve breastfeeding practices?: A randomised controlled trial. *International Journal of Nursing Studies*, *50*(1), 16–25.

Tarrant, C. (2003). Qualitative study of the meaning of personal care in general practice. *BMJ*, *326*(7402), 1310–1310. https://doi.org/10.1136/bmj.326.7402.1310

The National Institute for Health and Care Excellence. (2014). *Maternal and child nutrition: Guidance and guidelines (PH11)*. Retrieved from https://www.nice.org.uk/guidance/PH11/chapter/4-Recommendations#breastfeeding-3

The Organisation for Economic Co-operation and Development (OECD). (2018). Country Risk Classification. Retrieved June 8, 2018, from http://www.oecd.org/tad/xcred/crc.htm

Thompson, J. M., Tanabe, K., Moon, R. Y., Mitchell, E. A., McGarvey, C., Tappin, D., Blair, P.S., Hauck, F. R. (2017). Duration of breastfeeding and risk of SIDS: an individual participant data meta-analysis. *Pediatrics*, *140*(5), e20171324.

UNICEF, U. K. (2011). *How to implement baby friendly standards: a guide for community settings*.

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., Murch, S., Sankar, M.J., Walker, N., Rollins, N.C. (2016). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The Lancet*, *387*(10017), 475–490.

Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behaviour. *The Lancet*, *376*(9748), 1261–1271.

Wambach, K. A. (1997). Breastfeeding intention and outcome: A test of the theory of planned behavior. *Research in nursing & health*, *20*(1), 51-59.

Washio, Y., Humphreys, M., Colchado, E., Sierra-Ortiz, M., Zhang, Z., Collins, B. N., Kilby, L.M., Chapman, D.J., Higgins, S.T., Kirby, K. C. (2017). Incentive-based intervention to maintain breastfeeding among low-income Puerto Rican mothers. *Pediatrics*, e20163119.

World Health Organization. (2011). *Exclusive breastfeeding for six months best for babies everywhere*. Retrieved from http://www.who.int/mediacentre/news/statements/2011/breastfeeding_20110115/en/

Yan, J., Liu, L., Zhu, Y., Huang, G., & Wang, P. P. (2014). The association between breastfeeding and childhood obesity: a meta-analysis. *BMC Public Health*, *14*(1), 1267.

Appendix A

Search strategy

Medline (including ahead of print and in-process & other non-indexed citations

1 Breast Feeding/

2 breast feeding.ti,ab

3 breastfeeding.ti,ab

4 breastfeeding duration.ti,ab

5 continued breastfeeding.ti,ab

6 exclusive breastfeeding.ti,ab

7 Postpartum Period/

8 postpartum.ti,ab

9 postpartum period.ti,ab

10 post partum.ti,ab

11 1 or 2 or 3 or 4 or 5 or 6

12 7 or 8 or 9 or 10 or 11 or 12

13 13 or 14 or 15 or 16

14 ((17 or 18)) ---------- ((17 and 18))

15 intervent*.ti,ab

16 Randomized Controlled Trial/

17 randomized controlled trial.ti,ab

18 RCT.ti,ab

19. post natal

Note. Puerperium was indexed as postpartum period in 2005 and thus was not included. Post-natal referred to care for baby.

Appendix B

PRISMA Statement

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4-9
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	9
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	9
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	10
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	9
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	9-10, Appendix
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	9-11
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	11-13

Section/topic	#	Checklist item	Reported on page #
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	10-11
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	13-14
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	12-13
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	13
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	13
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	13-14
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	14, Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	14-15 (Table 1)
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Figure 2
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Figures 3a-d
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	15-16
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	17
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	18-19
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	19-24
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	24
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	29
FUNDING			

Section/topic	#	Checklist item	Reported on page #
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	Acknowledgements

Source: Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group (2009)

Figures' captions

Figure 1 *Flow Diagram for Search and Screening for Studies in the Review and Meta-Analysis*

Figure 2 *Quality Assessment of the Randomized Controlled Trials (RCTs) Included in the Review*

Figures 3a-3d *Forest Plots for Exclusive Breastfeeding Interventions vs. Control per Time-Interval*

Tables with captions

Table 1 *Main Characteristics of Included Studies in the Review (N = 23)*

Study	Location	Study period	OECD	Design	Age (M, SD)	Sample	Sample (Intervention)	Attrition	Follow-up
Abbas-Dick 2015	Canada	2012	Y	RCT	30.4 (3.7)	214	107	18	6, 12 w.
Ahmed 2016	U.S.A.	NR	Y	RCT	29.2 (6.3)	106	49	10	1,2,3 m.
Aksu 2011	Turkey	2008	Y	RCT	22.5 (3.5)	60	30	6	2,6 w. 6,18 m.
Albert 2011	U.S.A.	NR	Y	RCT	30.3 (4.4)	46	23	0	<1 w.
Bica 2014	Brazil	2006-2008	N	RCT	17.4 (1.5)	342	167	126	12 m.

Study	Location	Study period	OECD	Design	Age (M, SD)	Sample	Sample (Intervention)	Attrition	Follow-up
Dennis 2002	Canada	1997-1998	Y	RCT	75% 25-34	258	132	2	4,8,12 w.
Frank 1987	U.S.A.	NR	Y	RTC	25.7 (NR)	343	171	19	2,4 m.
Fu 2014	Hong Kong	2010-2011	N	CRCT	30.5 (4.5)	724	191, 269	24	1,2,3,6 m.
Giglia 2015	Australia	2010-2011	Y	RCT	NR	427	207	7	4,10,16, 26 w.
Grossman 1990	U.S.A.	1986-1987	Y	RCT	24.8 (5.6)	97	49	NR	6 w., 3,6 m.
Gu 2016	China	2013-2014	N	RCT	29.6 (3.4)	352	180	128	3 d., 6 w., 4,6 m.
Henderson 2001	Australia	1999	Y	RCT	27.6 (5.6)	160	80	10	6 w., 3,6 m.
Kang 2008	S. Korea	2005-2006	Y	NRCT	63% 25-30	60	30	8	4,8,12 w.
Khresheh 2011	Jordan	2008-2009	N	RCT	36 (NR)	90	45	50	6 m.
Kronborg 2007	Denmark	NR	Y	CRCT	NR	1595	780	NR	6 m.

Study	Location	Study period	OECD	Design	Age (M, SD)	Sample	Sample (Intervention)	Attrition	Follow-up
Labarere 2005	France	2001-2002	Y	RCT	29.3 (4.1)	231	116	5	4, 26 w.
McDonald 2010	Australia	2001	Y	RCT	58 % 25-35	849	425	67	2,6 m.
McLachlan 2016	Australia	2012-2013	Y	CRCT	31.4 (5.1)	6675	2281, 2344	2636	3,4,6 m.
Porteous 2000	Canada	2001	Y	RCT	NR	51	26	1	4 w.
Pugh 2010	U.S.A	NR	Y	RCT	23.1 (5.3)	328	168	34	6,12,24 w.
Schy 1996	U.S.A	1991-1993	Y	RCT	28 (4.5)	150	75	NR	6 m.
Tahir 2013	Malaysia	2010-2011	N	RCT	28.6 (5.5)	357	179	10.9%	1,4,6 m.
Washio 2017	U.S.A.	2015-2016	Y	RCT	24.1 (4.7)	36	18	0	6 m.

Note. OECD = Organization for Economic Cooperation and Development (country classification); RCT = Randomized controlled trial; CRCT = Clustered randomized controlled trial; NRCT = Non-randomized controlled trial; NR = Not reported; When whole sample's age was not provided, the intervention groups' age is reported.

Table 2 *Main Characteristics of Included Interventions and Main Outcomes (N = 23)*

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
Abbas-Dick 2015	3 weeks	Combined	Provider	During hospital stay postpartum	5	N	Y	More mothers in intervention group were exclusively breastfeeding at 6 and 12 weeks, but not statistically significant
Ahmed 2016	30 days	Remote	Peer	NR	6	Y	N/A	More mothers in intervention group were exclusively breastfeeding at 1, 2, and 3 months (at month 3, 84% in intervention compared to 66% in the control)
Aksu 2011	< 1 day	Face-to-face	Peer	3 days from delivery	6	Y	N/A	Significant increase in exclusive breastfeeding in intervention group at 2, 6 weeks and 6 months

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								after delivery. Significantly longer breastfeeding duration in intervention even if declined.
Albert 2011	NR	Face-to-face	Provider	Long	2	N	N/A	No impact on exclusive breastfeeding duration.
Bica 2014	4 months	Face-to-face	Provider	24-72 hours from delivery	4	N/A	Y	Significant differences in mixed breastfeeding among adolescent mothers who did not live with their own mothers but not among those who lived in the same household as their mother.
Dennis 2002	12 weeks	Combined	Peer	During hospital stay	4	Y	Y	Significantly more mothers in

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
				postpartum				intervention group than control were exclusively breastfeeding at 4 and 12 weeks. Mothers in the intervention group were 2.5 times more likely than those in the control to breastfeed at all time-points
Frank 1987	3 months	Combined	Provider	Within 1 week from delivery	3	Y	N/A	Some effect of intervention at 2 but not at 4 months.
Fu 2014	4 weeks	Remote	Provider	Immediate	9	Y	Y	Both telephone and in-hospital support significantly increased the rates of breastfeeding in the early

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								postnatal period. Telephone support had greater effect than in-hospital support for both mixed and exclusive breastfeeding.
Giglia 2015	21 months	Remote	Peer	NR	3	Y	N/A	Significantly more women in the intervention group were exclusively breastfeeding at 26 weeks compared to control. For week 16 the difference was 10% and slightly non-significant.
Grossman 1990	3 weeks	Combined	Provider	Within 1 week from delivery	6	N/A	N	No influence for mixed breastfeedin

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								g at 6 weeks.
Gu 2016	6 months	Combined	Provider	1 day after delivery	8	Y	N/A	More mothers in the intervention group were exclusively breastfeeding at all time-points compared to control.
Henderson 2001	3 days	Face-to-face	Provider	Within 1 day from delivery	5	N/A	N	No significant differences on mixed breastfeeding at all time-points.
Kang 2008	3 days	Face-to-face	Provider	Immediate	14	Y	N/A	Significantly more mothers in the intervention group were exclusively breastfeeding compared to control at all time-points.
Khresheh 2011	4 months	Combined	Provider	2 hours after delivery	8	N/A	N	No significant differences

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								on mixed breastfeeding at 6 months.
Kronborg 2007	6 months	Face-to-face	Provider	NR	6	Y	N/A	At six months after delivery more mothers (7.7%) in the intervention group were exclusively breastfeeding compared to control (4.9%) with no indication of significance.
Labarere 2005	4 weeks	Face-to-face	Provider	Within 2 weeks after delivery	1	Y	N	Significantly more mothers in intervention group were exclusively breastfeeding compared to control at 4 weeks. No difference

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								between groups on mixed breastfeeding at 4 weeks.
McDonald 2010	6 weeks	Combined	Provider	During hospital stay postpartum	5	N	N	No significant differences on mixed and exclusive breastfeeding between groups.
McLachlan 2016	9 months	Face-to-face	Provider	Within 1 week after delivery	3	N/A	N	No significant differences on mixed breastfeeding between groups at all time-points.
Porteous 2000	4 weeks	Combined	Provider	Immediate	4	Y	N/A	Significant improvement at 4 weeks and 100% of intervention group continued to exclusively breastfeed.

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
Pugh 2010	NR	Combined	Combined	Within 48 hours after delivery	3	N/A	Y	Significantly more mothers in the intervention group were mixed breastfeeding compared to control at 6 weeks, non-significantly but higher at 12 weeks and no differences at 24 weeks.
Schy 1996	NR	Combined	Provider	During hospital stay postpartum	3	N/A	N	No significant differences on exclusive breastfeeding between groups.
Tahir 2013	6 months	Remote	Provider	Within 1 week after delivery	1	Y	N/A	More mothers in the intervention group were exclusively breastfeeding compared to control at

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								1 month with a small effect size (phi = 0.12). At fourth and sixth months postpartum there was no statistical difference between groups. Exclusive breastfeeding rates at the first month postpartum dropped from 79.6% to 40.5% and 12.3% at the fourth and sixth months postpartum respectively.
Washio 2017	6 months	Face-to-face	Provider	Within 1 month after delivery	2	N/A	Y	More mothers in the intervention group were mixed

Study	Length	Mode of delivery	Delivered by	Time of delivery	N of BCTs	EBF effective ≥ 1 time-point	MBF effective ≥ 1 time-point	Main findings
								breastfeeding and with longer duration compared to control at all time-points

Note. BCT = Behaviour Change Techniques; EBF = Exclusive breastfeeding; MBF = Mixed breastfeeding; NR = Not reported; N/A = Not assessed.

Table 3 *The Behaviour Change Techniques (BCTs) Per Time Interval*

	Studies	BCTs	*n* of studies using the BCT	Odds Ratio	95% C.I.
Birth-four weeks	Ahmed 2016; Aksu 2011; Dennis 2002; Fu 2014; Giglia 2015; Kang 2008; Labarere 2005; Porteous 2000; Tahir 2013	1.2 Problem solving	5	1.77	1.47-2.13
		1.3 Goal setting (outcome)	1		
		1.4 Action planning	1		
		1.5 Review behaviour goal	1		
		1.7 Review outcome goal	1		
		1.9 Commitment	1		
		2.2 Feedback on behaviour	3		
		2.3 Self-monitoring of behaviour	1		
		2.7 Feedback on the outcomes of the behaviour	1		
		3.1 Social support (unspecified)	4		
		3.2 Social support (practical)	2		
		3.3 Social support (emotional)	1		
		4.1 Instructions on how to perform the behaviour	5		
		5.1 Information on health consequences	2		
		5.3 Information about social and environmental consequences	1		
		5.4 Monitoring emotional consequences	1		
		5.6 Information about emotional consequences	2		
			2		
			9		
			1		
			1		

	Studies	BCTs	*n* of studies using the BCT	Odds Ratio	95% C.I.
		6.1 Demonstration of the behaviour 8.1 Behavioural practice/rehearsal 9.1 Credible source 9.2 Pros and cons 15.1 Verbal persuasion about capability			
Five-eight weeks	Abbas-Dick 2015; Ahmed 2016; Aksu 2011; Dennis 2002; Fu 2014; Gu 2016; Kang 2008	1.2 Problem solving 1.3 Goal setting (outcome) 1.4 Action planning 1.5 Review behaviour goal 1.7 Review outcome goal 1.9 Commitment 2.2 Feedback on behaviour 2.3 Self-monitoring of behaviour 2.7 Feedback on the outcomes of the behaviour 3.1 Social support (unspecified) 3.2 Social support (practical) 3.3 Social support (emotional) 4.1 Instructions on how to perform the behaviour 5.1 Information on health consequences 5.3 Information about social and environmental consequences 5.4 Monitoring emotional consequences 5.6 Information about emotional consequences 6.1 Demonstration of the behaviour 7.1 Prompts/cues 8.1 Behavioural practice/rehearsal 9.1 Credible source 9.2 Pros and cons 15.1 Verbal persuasion about capability	4 1 1 1 1 1 2 1 1 4 2 1 6 2 2 1 1 4 1 2 7 1 1	2.06	1.42-2.99

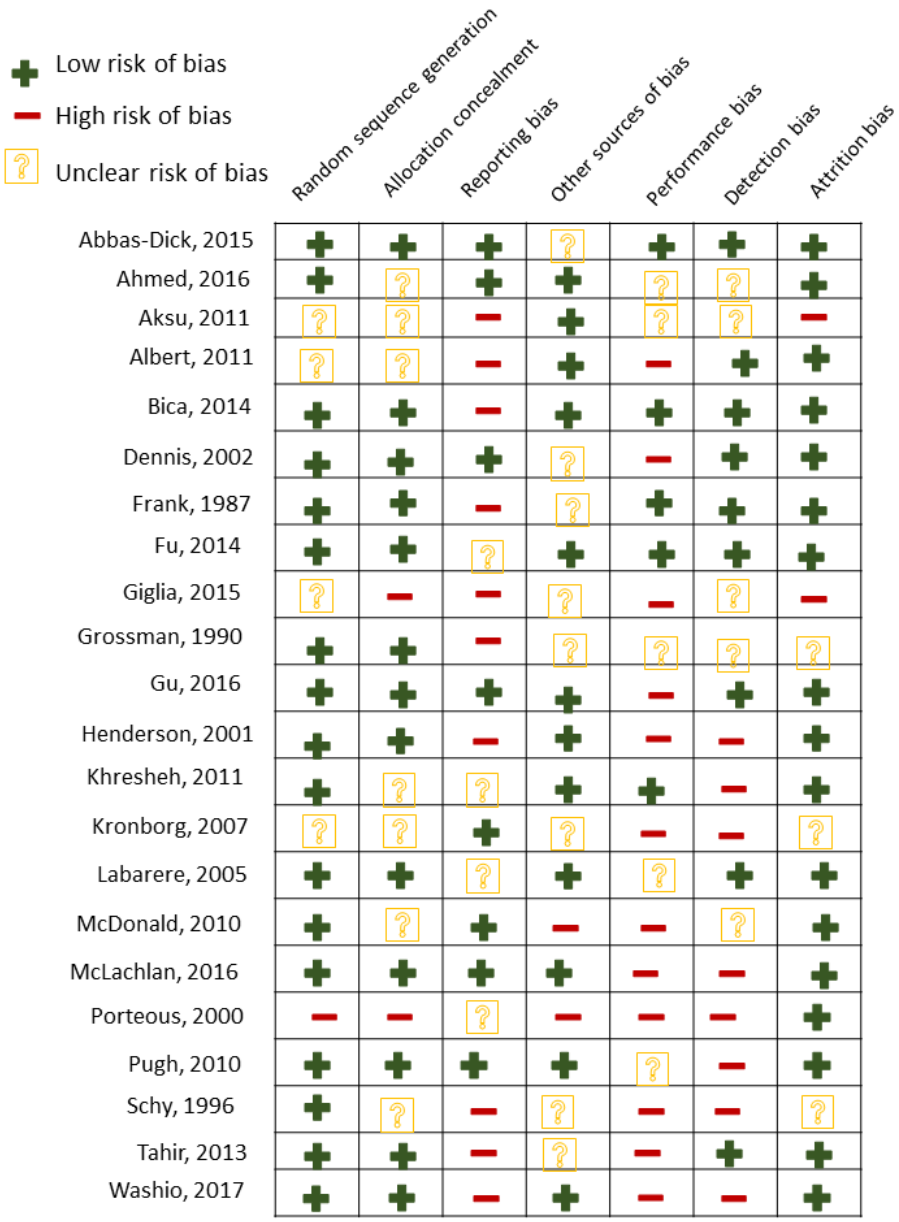
	Studies	BCTs	*n* of studies using the BCT	Odds Ratio	95% C.I.
Nine-12 weeks	Abbas-Dick 2015; Ahmed 2016; Dennis 2002; Fu 2014; Giglia 2015; Kang 2008	1.2 Problem solving 1.3 Goal setting (outcome) 1.4 Action planning 1.5 Review behaviour goal 1.7 Review outcome goal 1.9 Commitment 2.2 Feedback on behaviour 2.3 Self-monitoring of behaviour 2.7 Feedback on the outcomes of the behaviour 3.1 Social support (unspecified) 3.2 Social support (practical) 3.3 Social support (emotional) 4.1 Instructions on how to perform the behaviour 5.1 Information on health consequences 5.4 Monitoring emotional consequences 5.6 Information about emotional consequences 7.1 Prompts/cues 8.1 Behavioural practice/rehearsal 9.1 Credible source 15.1 Verbal persuasion about capability	3 1 1 1 1 1 2 1 1 4 2 1 5 2 1 1 1 2 6 1	1.82	1.29-2.56
≥ 13 weeks	Aksu 2011; Fu 2014; Giglia 2015; Gu 2016; Kronborg 2007; McDonald 2010; Tahir 2013	1.2 Problem solving 2.2 Feedback on behaviour 2.3 Self-monitoring of behaviour 2.4 Self-monitoring of outcome of behaviour 3.1 Social support (unspecified) 3.2 Social support (practical) 4.1 Instruction on how to perform the behaviour 5.1 Information on health consequences 5.3 Information about social and environmental consequences	3 2 1 1 4 1 5 1 3 1 3 2 6	1.63	1.07-2.47

Studies	BCTs	*n* of studies using the BCT	Odds Ratio	95% C.I.
	5.6 Information about emotional consequences	1		
	6.1 Demonstration of the behaviour	1		
	8.1 Behavioural practice/rehearsal			
	9.1 Credible source			
	9.2 Pros and cons			
	11.2 Reduce negative emotions			

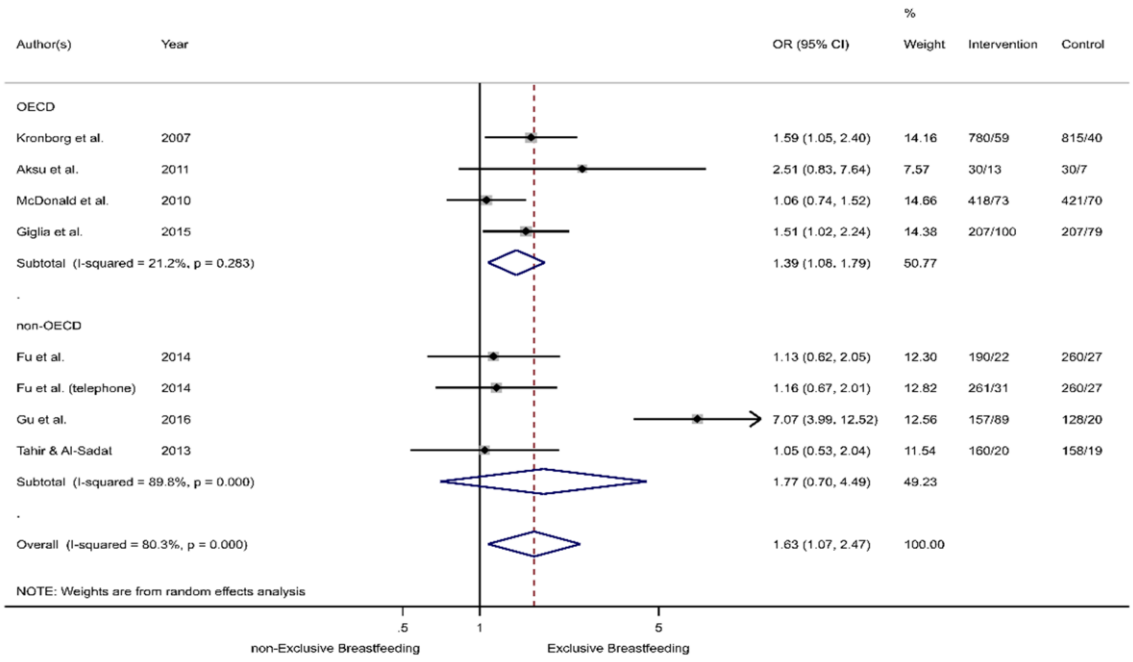
Table 4 *Sensitivity Analyses of Included Studies*

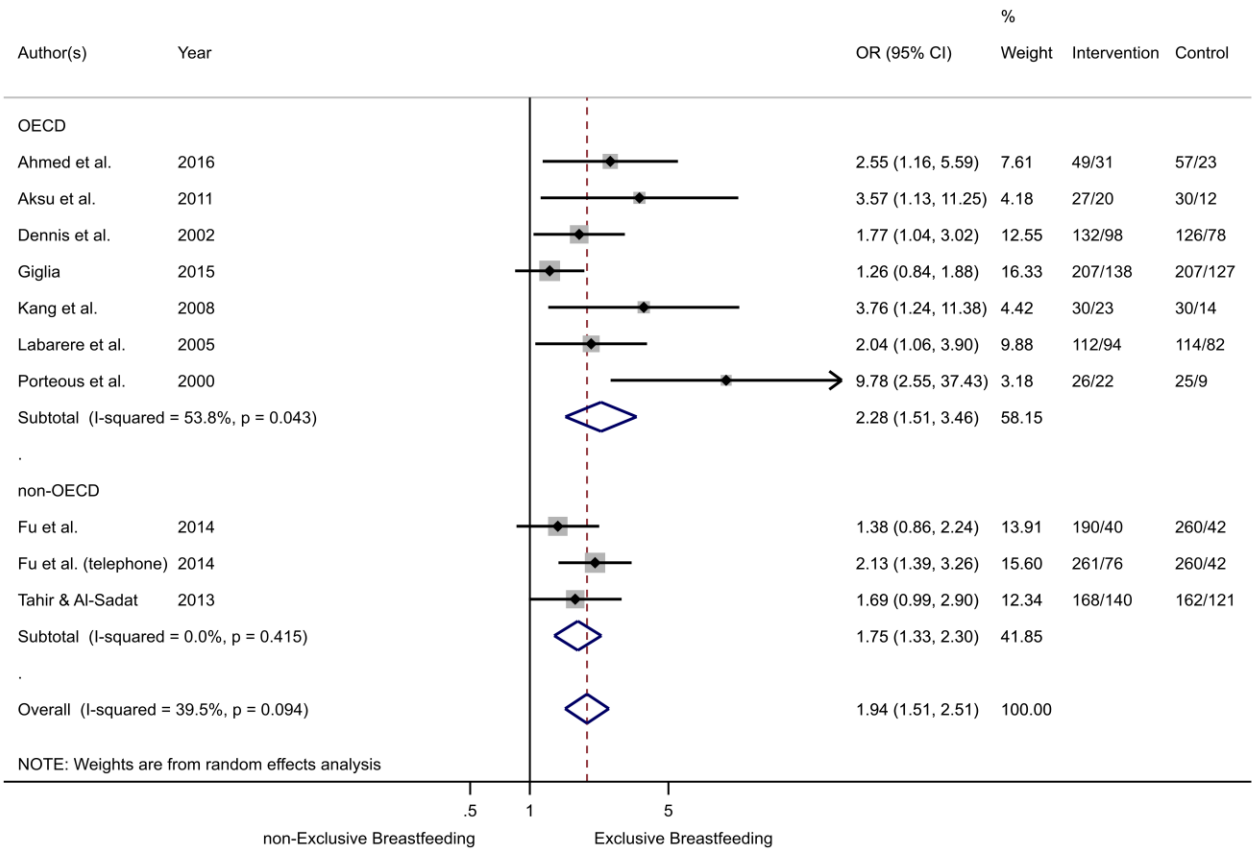
Type of Sensitivity Analysis	Birth – 4 weeks		5 – 8 weeks		9 – 12 weeks		13 weeks - beyond	
	Odds Ratio	95% C.I.	Odds Ratio	95% C.I.	Odds Ratio	95% C.I.	Odds Ratio	95% C.I.
All included studies	1.77	1.47-2.13	2.06	1.42-2.99	1.82	1.26-2.56	1.63	1.07-2.47
Study Quality (without studies with high or unclear risk > 3 sources of bias)	1.88	1.52-2.34	2.00	1.34-2.97	1.98	1.29-3.04	1.77	0.70-4.49
BCT in Control Group (without studies including at least one BCT in control group)	1.86	1.49-2.31	1.45	1.13-1.85	1.66	1.16-2.38	1.09	0.85-1.40
Research Design (without non-RCTs)	1.73	1.44-2.09	2.05	1.37-3.07	1.64	1.21-2.22	N/A	N/A

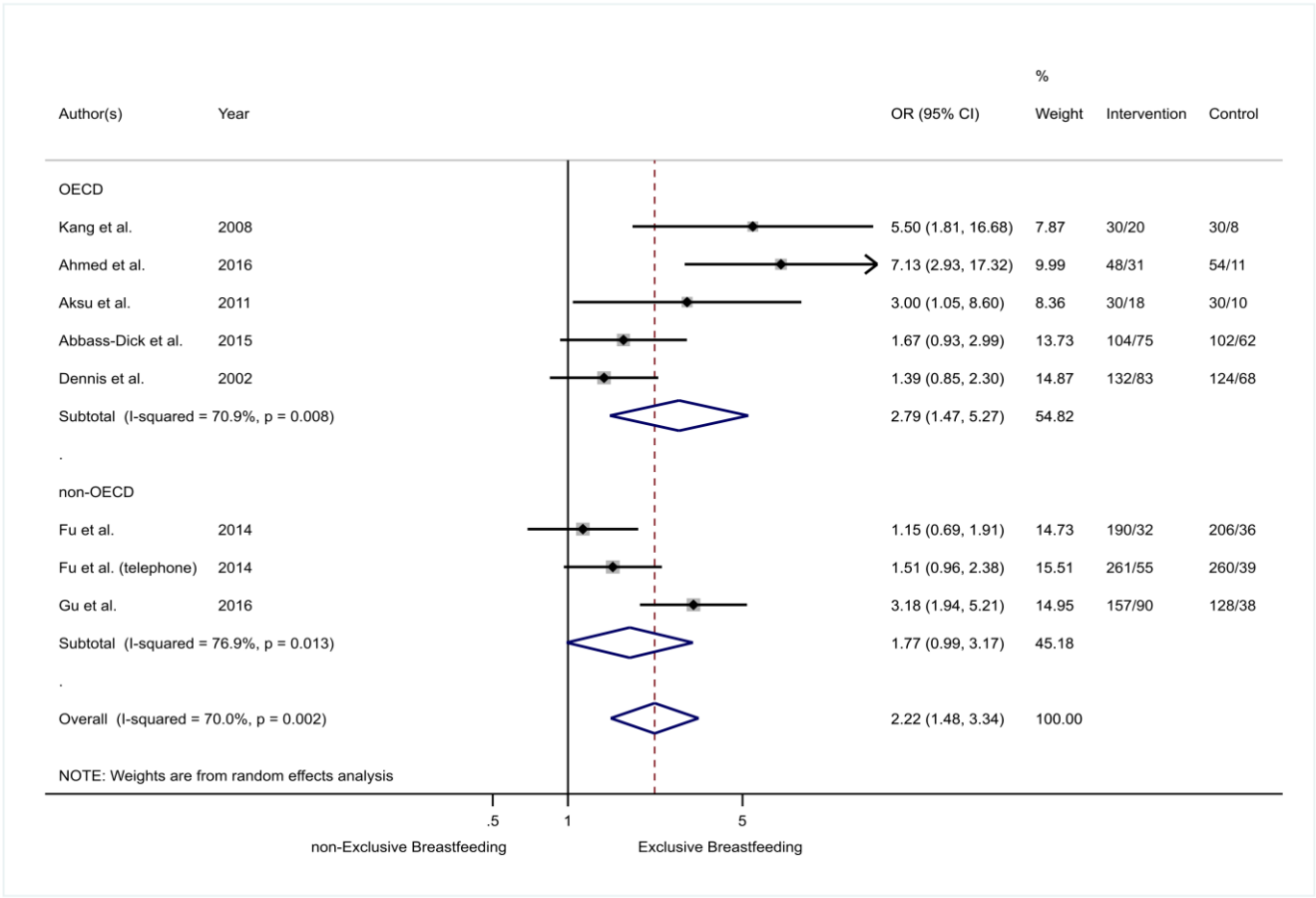
Note. There was no non-RCT for the '13 weeks and beyond' interval


Low risk of bias
High risk of bias
Unclear risk of bias
Random sequence generation
Allocation concealment
Reporting bias
Other sources of bias
Performance bias
Detection bias
Attrition bias
Abbas-Dick, 2015
Ahmed, 2016
Aksu, 2011
Albert, 2011
Bica, 2014
Dennis, 2002
Frank, 1987
Fu, 2014
Giglia, 2015
Grossman, 1990
Gu, 2016
Henderson, 2001
Khresheh, 2011
Kronborg, 2007
Labarere, 2005
McDonald, 2010
McLachlan, 2016
Porteous, 2000
Pugh, 2010
Schy, 1996
Tahir, 2013
Washio, 2017

≥ 13 weeks




Author(s)
Year
OR (95% CI)
% Weight
Intervention
Control
OECD
Ahmed et al. 2016 2.55 (1.16, 5.59) 7.61 49/31 57/23
Aksu et al. 2011 3.57 (1.13, 11.25) 4.18 27/20 30/12
Dennis et al. 2002 1.77 (1.04, 3.02) 12.55 132/98 126/78
Giglia 2015 1.26 (0.84, 1.88) 16.33 207/138 207/127
Kang et al. 2008 3.76 (1.24, 11.38) 4.42 30/23 30/14
Labarere et al. 2005 2.04 (1.06, 3.90) 9.88 112/94 114/82
Porteous et al. 2000 9.78 (2.55, 37.43) 3.18 26/22 25/9
Subtotal (I-squared = 53.8%, p = 0.043) 2.28 (1.51, 3.46) 58.15
non-OECD
Fu et al. 2014 1.38 (0.86, 2.24) 13.91 190/40 260/42
Fu et al. (telephone) 2014 2.13 (1.39, 3.26) 15.60 261/76 260/42
Tahir & Al-Sadat 2013 1.69 (0.99, 2.90) 12.34 168/140 162/121
Subtotal (I-squared = 0.0%, p = 0.415) 1.75 (1.33, 2.30) 41.85
Overall (I-squared = 39.5%, p = 0.094) 1.94 (1.51, 2.51) 100.00
NOTE: Weights are from random effects analysis
.5
1
5
non-Exclusive Breastfeeding
Exclusive Breastfeeding


Author(s)
Year
OR (95% CI)
% Weight
Intervention
Control
OECD
Kang et al. 2008 5.50 (1.81, 16.68) 7.87 30/20 30/8
Ahmed et al. 2016 7.13 (2.93, 17.32) 9.99 48/31 54/11
Aksu et al. 2011 3.00 (1.05, 8.60) 8.36 30/18 30/10
Abbass-Dick et al. 2015 1.67 (0.93, 2.99) 13.73 104/75 102/62
Dennis et al. 2002 1.39 (0.85, 2.30) 14.87 132/83 124/68
Subtotal (I-squared = 70.9%, p = 0.008) 2.79 (1.47, 5.27) 54.82
.
non-OECD
Fu et al. 2014 1.15 (0.69, 1.91) 14.73 190/32 206/36
Fu et al. (telephone) 2014 1.51 (0.96, 2.38) 15.51 261/55 260/39
Gu et al. 2016 3.18 (1.94, 5.21) 14.95 157/90 128/38
Subtotal (I-squared = 76.9%, p = 0.013) 1.77 (0.99, 3.17) 45.18
.
Overall (I-squared = 70.0%, p = 0.002) 2.22 (1.48, 3.34) 100.00
NOTE: Weights are from random effects analysis
.5
1
5
non-Exclusive Breastfeeding
Exclusive Breastfeeding

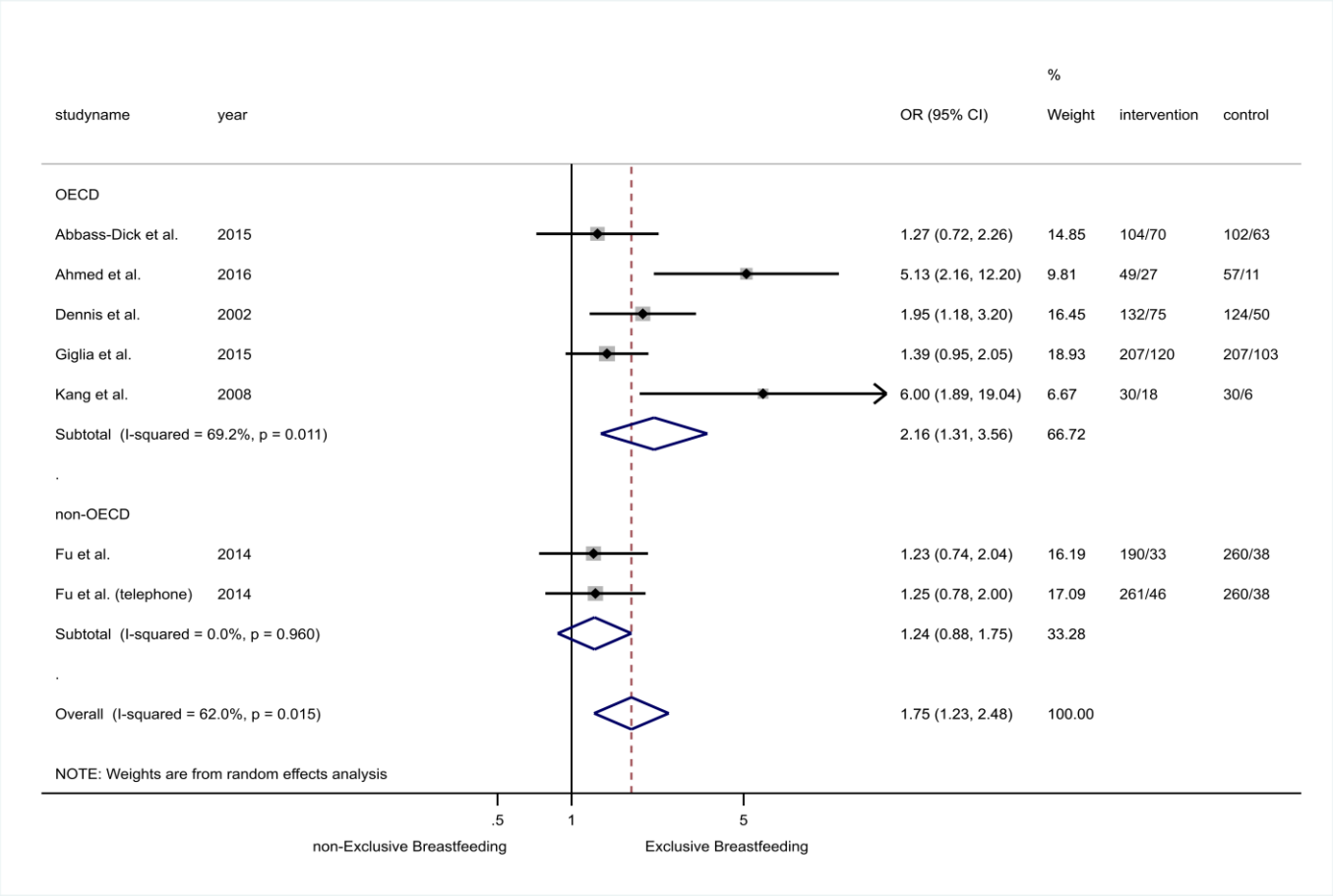


Table A1.

Characteristics and Key findings of Included Studies in the Review (N = 23)

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Abbas-Dick 2015 Location: Canada Study period: Mar-Jul 2012	Eligibility: Primiparous mothers in the first 2 days postpartum who had a singleton birth and were >18 years old, >37 weeks gestation at delivery, English speaking,	Differences at baseline: IG more likely to have attended a prenatal class Attrition: 18	Name: Co-parenting breastfeeding support intervention Theoretical framework: None Intensity: 3 follow up	Primary - More mothers in IG exclusively BF at 6 and 12 weeks, but not statistically significant Secondary	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Research design: RCT	living with a male partner Total sample: 214 Total IG: 107 Age: 30.4 (3.7), IG: 30.4 (3.8); CG: 30.7 (3.8) Postpartum week at recruitment: Immediate (within 2 days) Postpartum week at start of intervention: Immediate (during postpartum hospital stay)	Data collection: Telephone interview or electronic questionnaire Follow up: 6 and 12 weeks Type of outcome: Rates for exclusive BF	contacts (2 e mail, one phone call). Length: 3 weeks Delivered by: Lactation consultant in the hospital. Not clear who sends the e mails or makes the 3 week phone call Training: NR Control: Standard care	- Significantly greater improvement in paternal BF self-efficacy in the IG. - Significantly more mothers in the IG were satisfied with their partners involvement	
Ahmed 2016 Location: U.S.A. Study period: NR Research design: RCT	Eligibility: Mothers who read and speak English, ≥ 18 years old, an intention to continue BF after discharge, no serious medical condition that prevents BF, basic knowledge of how to use the Internet, and access to electronic mail, with infants ≥37 gestational weeks. Total sample: 106	Differences at baseline: No differences Attrition: 10 in total, 2 lost in CG to 1 month, 1 in IG and 1 in CG to 2 months and 2 in CG and 4 in IG to 3 months Data collection: Online questionnaire	Name: None Theoretical framework: None Intensity: 30 days online Length: 30 days Delivered by: Online Training: NR Control: Following the standard care of the hospital unit (breastfeeding support and education before	Primary - Better exclusive BF rates in the IG at 1, 2, and 3 months. - At month 3 84% of the IG was BF compared to 66% in the CG. Secondary - Postpartum depression symptom scores decreased for both groups at 1, 2, and 3 months.	There was a 96%, 91% and 80% survey response rate for the first, second and third month respectively among the CG, and 100%, 92% and 88%, respectively for the IG.

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Total IG: 49 Age: IG: 29.2 (6.3) CG: 29.9 (6.5) Postpartum week at recruitment: NR Postpartum week at start of intervention: NR	Follow up: 1, 2 and 3 months Type of outcome: Rates for exclusive BF	discharge, one phone call within the first week after hospital discharge, and a list of community resources). Mothers were encouraged to contact the lactation specialist with any problems.	- No significant difference between groups at 1, 2, and 3 months for depression. - The IG had significantly higher BF intensity.	
Aksu 2011 Location: Turkey Study period: Mar-Jul 2008 Research design: RCT	Eligibility: Primaparous women, giving birth through the vaginal route, delivering a healthy newborn, birth occurring at the gestational age of 37 weeks or more, giving birth to a singleton baby, providing informed consent, living in the city of Aydın,, being able to communicate/speak in Turkish, not using any drugs that would likely affect breast milk, having an intention to breastfeed, not having a history of chronic diseases, and not smoking. Total sample: 60	Differences at baseline: No differences Attrition: 6 (3 for each group). No information on reasons or follow-up Data collection: Questionnaire ether by phone or by visit Follow up: 2 weeks, 6 weeks, 6 months, 18 months Type of outcome: Duration for exclusive and mixed BF	Name: None Theoretical framework: None Intensity: Standard training to both groups 20-30 minutes, BF support for IG 30 minutes Length: 30 minutes Delivered by: 'Supporters' (no further information) Training: Trained using the 18-hour WHO/UNICEF BF counselling/lactation management courses under the supervision of the researchers. Specific BF materials, including a	Primary - The IG had a significant increase in exclusive BF both at 2 weeks and 6 weeks and at 6 months after delivery. - Significantly longer total BF duration in IG compared to CG even if this declined. Secondary - Significantly higher mean BF knowledge scores at 2 weeks and at 6 weeks after delivery in the IG. - The decrease in BF knowledge scores from 2 weeks to 6 weeks after	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Total IG: 30 Age: IG: 22.5 (3.5), CG: 23.0 (4.6) Postpartum week at recruitment: Immediate (at birth) Postpartum week at start of intervention: Immediate (3 days from delivery)		picture guide and a brochure were used. Then role-playing was repeated until every supporter performed every step of the program without mistakes. Control: In the first few hours after delivery, all women in both groups received standard BF education and support from nurses and midwives (20-30 minutes).	delivery in both groups was statistically significant	
Albert 2011 Location: U.S.A. Study period: NR Research design: RCT	Eligibility: Convenience sample, at least 18 years, English speaking, exclusively breastfeeding, >37 0/7 weeks gestation Total sample: 46 Total IG: 23 Age: IG: 30.3 (4.4) CG: 32.1 (5.0) Postpartum week at recruitment: Long	Differences at baseline: control group mothers more highly educated Attrition: 0 Data collection: Study Feeding Diary and Obstetric Research Study Questionnaire Follow up: < 1 week	Name: None Theoretical framework: None Intensity: NR Length: NR Delivered by: Research team Training: Education was provided to medical, nursing and ancillary staff through staff meetings and memos Control: Routine hospital care,	Primary - No impact on BF duration at < 1-week follow up. Secondary - No differences in numbers of breastfeeding sessions, - 2 % of infant weight loss - IG mothers had lower breastfeeding interruptions	The IG mothers thought that intervention was successful

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Postpartum week at start of intervention: NR	Type of outcome: Mixed BF duration	received the diary to complete		
Bica 2014 Location: Brazil Study period: May 2006 – Jan 2008 Research design: RCT	Eligibility: Younger than 20 years, health singleton pregnancy, birth weight 2,500g or greater, rooming in with child, had begun breastfeeding Total sample: 342 Total IG: 167 Age: IG: 17.4 (1.5), CG: 17.5 (1.4) Postpartum week at recruitment: Immediate Postpartum week at start of intervention: Immediate (first session on maternity ward 24-72 hours after delivery)	Differences at baseline: No differences Attrition: 126 Data collection: Telephone interviews or home visits, face to face Follow up: 12 months Type of outcome: Rates for mixed BF	Name: None Theoretical framework: None Intensity: On maternity ward then at 7, 15, 30, 60 and 120 days Length: 4 months Delivered by: Lactation consultants (two nurses, a dietician and a paediatrician) Training: NR Control: Standard care	Primary - No significant influence on BF frequency in the first year of life when the child's maternal grandmother lived in the same household as the mother-child pair Secondary - Intervention was highly successful among adolescent mothers who did not live with their own mothers.	None
Dennis 2002 Location: Canada Study period:	Eligibility: in-hospital primiparous BF women, at least 16 years of age, English speaking, singleton birth at 37 weeks	Differences at baseline: Significantly more mothers in the IG decided to BF before	Name: Peer support Theoretical framework: None Intensity: Peer support workers	Primary - Mothers in the IG were 2.5 times more likely than those in the CG to continue to BF	Outcome of mixed BF less rigorous than exclusive BF. Intervention seemed acceptable. There was

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Sep 1997-Jun1998 Research design: RCT	gestation or later, living in local area Total sample: 258 Total IG: 132 Age: IG: 14.4% age 16-24, 75% age 25-34, 10.6% age >35; CG 12.9% age 16-24, 74.2% age 25-34, 12.9% age >35 Postpartum week at recruitment: Immediate (during hospital stay) Postpartum week at start of intervention: Immediate (during hospital stay)	pregnancy (73.5% vs. 58.9%). Fewer women in the IG had a caesarean section (18.9% vs. 27.4%) - not statistically but only clinically different Attrition: 2 (CG) Data collection: Questionnaire Follow up: 4, 8 and 12 weeks Type of outcome: Rates for exclusive and mixed BF	made contact with women within 48 hours after hospital discharge. Peer volunteer contacts were individually tailored depending on need. The majority of women in the IG received an average of 5 or more connections (mean = 5.4, SD 3.6). Length: 3 months Delivered by: Peer support workers: volunteers who were not part of women's families or immediate peer support network. Recruited as volunteers who possessed experiential knowledge and were matched for similar characteristics. Training: 2.5 hour orientation session	at all time points. - Significantly more mothers in IG were exclusively BF at 4 weeks and at 12 weeks.	high fidelity and high ratings of satisfaction with peer support

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
			Control: Usual care: hospital and community care support services managed by lactation consultants, telephone BF support line managed by hospital nursing staff, support services provided by nurses. Hospitals involved had 'not completely' implemented the 10 steps of WHO baby friendly hospital initiative		
Frank 1987 Location: U.S.A. Study period: NR Research design: RCT	Eligibility: Postpartum women Total sample: 343 Total IG: 171 Age: 25.7 Postpartum week at recruitment: Immediate (within 1 week) Postpartum week at start of intervention: Immediate (within 1 week)	Differences at baseline: No differences Attrition: 19 (5%) Data collection: Face to face interview at baseline, telephone interview at 4 month follow up Follow up: 2 and 4 months Type of outcome:	Name: None Theoretical framework: None Intensity: Eight phone calls at 5,7,14,21 and 28 days, then 6,8, and 12 weeks of infant age. Additional calls as necessary. Length: 3 months Delivered by: Trained BF counsellor Training: NR	Primary - Some effect at 2 months but not at 4 months. Secondary - Women who received both the research counselling and the research discharge pack were more likely to be BF at 1 month - Telephone contact did not exert a consistent positive effect	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
		Rates and duration for exclusive BF	Control: Standard care and routine discharge pack	on the duration of BF whereas research discharge pack did prolong the duration of BF by more than 2 weeks	
Fu 2014 Location: Hong Kong Study period: Nov 2010-Sep 2011 Research design: Clustered RCT	Eligibility: Hong Kong Chinese primiparum, > 18 years of age, intending to breastfeed, without any major obstetric complications or serious medical problems. Infant gestational age >37 weeks; birth weight >2500 grams, 5 minute Apgar score >8, no physical anomalies that would complicate BF Total sample: 724 Total IG: 191 in-hospital support, 269 telephone support Age: 30.5 (4.5), in-hospital support = 31.0 (4.6); telephone support = 30.3 (4.3)	Differences at baseline: Minor variations in maternal education, family income, intention to exclusively BF and antenatal BF class attendance Attrition: 24 Data collection: Follow up phone call Follow up: 1, 2, 3 and 6 months Type of outcome: Rates for exclusive and mixed BF	Name: None Theoretical framework: None Intensity: Three face to face sessions in hospital in first 48 hours for in-hospital support group. Weekly telephone support for up to 4 weeks for telephone support group Length: 4 weeks Delivered by: Trained midwives or lactation support specialist Training: Eight hours training to each person delivering intervention Control: Standard care	Primary - Both telephone and in hospital support significantly increased the rates of BF in the early postnatal period - Telephone support had greater effect than in hospital support for both mixed and exclusive BF Secondary - Women who received both the research counselling and the research discharge pack were more likely to be BF at 1 month	Good fidelity measures

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Postpartum week at recruitment: Immediate Postpartum week at start of intervention: Immediate			- Telephone contact did not exert a consistent positive effect on the duration of BF whereas research discharge pack did prolong the duration of BF by more than 2 weeks	
Giglia 2015 Location: Australia Study period: Mar 2010-Dec 2011 Research design: RCT (nested within a longitudinal cohort)	Eligibility: Recruited from hospitals with maternity service capacity from four regional areas of Western Australia. Total sample: 414 Total IG: 207 Age: NR Postpartum week at recruitment: Immediate (at birth) Postpartum week at start of intervention: NR	Differences at baseline: No differences Attrition: 7 with no follow-up Data collection: Online questionnaire Follow up: 4,10,16,26 weeks Type of outcome: Rates and duration for exclusive BF	Name: None Theoretical framework: None Intensity: Online forum, self-paced Length: 21 months Delivered by: Online forum (able to contact a certified lactation consultant) Training: NR Control: CG mothers accessed a website with helpful parenting and infant feeding information which was assessed for accuracy.	Primary - Significantly more women in the IG were continuing to exclusively BF 26 weeks later compared to CG. - For week 16 the difference is 10% with significance slightly short of the conventional statistical significance level of 5%. Secondary - Of all the women living in a remote area, higher proportions of those in the IG were exclusively BF at Week 4, 10,	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
				16, and 26 compared with the CG and difference was statistically significant only for week 26. - Women who had experienced BF problems at each time point accessed more the websites with the exception of week 52.	
Grossman 1990 Location: U.S.A. Study period: Mar 1986 – Jan 1987 Research design: RCT	Eligibility: 'Low income' women eligible for free Government 'women, infants and children' programme who delivered a full-term baby and intended to BF. Total sample: 97 Total IG: 49 Age: IG: 24.8 (5.6) CG: 25.1 (5.1) Postpartum week at recruitment: Immediate (within 1 week)	Differences at baseline: No differences Attrition: Not clear- Stated could not contact 4 from CG group at follow up, but 'at least some data' was collected for IG. However 10 missing from final statistical model because of 'incomplete data'.	Name: None Theoretical framework: None Intensity: 5 sessions - 45 minute face-to face sessions in hospital and others by telephone. Referral to more intensive support if needed. Length: 3 weeks Delivered by: Registered nurse with 'extensive experience of lactation counselling'.	Primary - No influence for BF at 6 weeks. - No significant differences for duration of BF. Secondary - Significant associations with BF at 6 weeks with employment, not smoking, attending antenatal class and planning to nurse.	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Postpartum week at start of intervention: Immediate (within 1 week)	Data collection: Telephone interview (for BF information) and medical records (for demographics) Follow up: 6 weeks, 3 months, 6 months Type of outcome: Rates for mixed BF	Training: NR Control: Routine teaching regarding infant care and deeding given by obstetrical and nursing staff.		
Gu 2016 Location: China Study period: Oct 2013-Jun 2014 Research design: RCT	Eligibility: Primiparous women with no illnesses preventing BF, who attended at least one antenatal class accompanied by parent/grandmother, who could read Mandarin and able to perform intervention activities. Total sample: 352 Total IG: 180	Differences at baseline: No differences Attrition: 128, IG: 23, CG: 44 Data collection: Interviews Follow up: 3 days. 6 weeks, 4 months, 6 months Type of outcome: Not clear	Name: None Theoretical framework: Theory of Planned Behaviour Intensity: Approximately 22 face to face/telephone sessions. One individual instruction, 2 group sessions and continued telephone counselling. Length: 6 months	Primary - Higher proportion of women in the IG BF at each time point compared to CG.	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Age: IG: 29.6 (3.4). CG: 29.0 (3.8) Postpartum week at recruitment: Immediate (day 1) Postpartum week at start of intervention: Immediate (day 1)	(Rates of exclusive BF)	Delivered by: Nurses Training: Protocol Control: Routine care: antenatal BF education class, rooming-in, BF initiation half hour after CB, lactation consulting support by nurses, BF leaflets, regular check-up and BF education 6 weeks postpartum.		
Henderson 2001 Location: Australia Study period: Jun-Sep 1999 Research design: RCT	Eligibility: First-time, English speaking mothers who planned to BF, had a singleton with Apgar score of 7 or more at birth. Total sample: 160 Total IG: 80 Age: CG: 27.2 (5.7) IG: 27.6 (5.6) Postpartum week at recruitment: Immediate (within 24 hours) Postpartum week at start of intervention:	Differences at baseline: No differences Attrition: 10, IG: 5, CG: 5 Data collection: Questionnaire Follow up: 6 weeks, 3 months, 6 months Type of outcome: Rates for mixed BF	Name: None Theoretical framework: None Intensity: 1 x 30 min session and up to 2 short further session in hospital Length: Not clear, delivered up to 3 days Delivered by: Researcher Training: NR Control: Usual care	Primary - No significant differences on BF at any time point. Secondary - Less nipple pain in hospital reported for IG but no difference at 3 time points. - No differences in nipple trauma reported between groups at any time point	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Immediate (within 24 hours)				
Kang 2008 Location: South Korea Study period: Dec 2005 – Jan 2006 Research design: Non RCT (non-equivalent control group non-synchronized design)	Eligibility: Mothers with no complications, a gestation period of 38–42 weeks, an Apgar score of 8 or higher, intending to breastfeed and able to understand and complete the questionnaires. Total sample: 60 Total IG: 30 Age: 63.3 % 25-30, 36.7% 31-35 years old. IG: 70% 25-30, 30% 31-35, CG: 56.7% 25-30, 43.3 % 31-35 years old. Postpartum week at recruitment: Immediate (3 days of entering clinic) Postpartum week at start of intervention: Immediate	Differences at baseline: No differences on BF empowerment and BF problems as well as other characteristics Attrition: 8 (3 from IG and 5 from CG) - no follow up, mention 'personal circumstances' Data collection: Mailed surveys for BF problems and telephone surveys for BF rate Follow up: 4, 8 and 12 weeks after childbirth Type of outcome: Rates for exclusive BF	Name: None Theoretical framework: Empowerment education philosophy of Freire (1983) Intensity: 4 X 60 minute sessions Length: 27 days Delivered by: Researcher with international certificate in BF specialist and an assistant with same qualifications Training: An international certificate as a BF specialist and the assistant was instructed and trained in the methods and procedures of data collection. Control: NR	Primary - BF rates in the IG were significantly higher (76.7%, 66.7% and 60% at 4, 8 and 12 weeks after childbirth respectively) compared to the CG (46.7%, 26.7% and 20%) Secondary - Significantly better scores for BF empowerment and BF problems in IG.	NR
Khresheh 2011	Eligibility: Primiparous	Differences at baseline:	Name: None	Primary	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Location: Jordan Study period: Aug 2008 – Apr 2009 Research design: RCT	women, given birth vaginally at gestation of > 36 weeks. Total sample: 90 Total IG: 45 Age: IG: 36 (80%) < 29 years. CG: 35 (78%) < 29 years. Postpartum week at recruitment: Immediate (soon after birth) Postpartum week at start of intervention: Immediate (2 hours after birth)	CG had higher rate of women from state postnatal centre than IG Attrition: IG: 27 CG: 23 Data collection: Before and after questionnaire on BF knowledge. Post data collection also included information on BF/bottle feeding behaviour. Pre questionnaire administered face to face by health professional. Post questionnaire administered face to face in IG and via telephone in CG. Follow up: 6 months	Theoretical framework: None Intensity: 3 face to face in hospital, 2 via telephone. Length: 4 months Delivered by: Researcher Training: NR Control: Usual care	- No significant differences between CG and IG at 6 months. Secondary - IG had increased levels of BF knowledge at 6 months PP compared to control. -	

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
		Type of outcome: Rates for mixed BF			
Kronborg 2007 Location: Denmark Study period: NR Research design: Cluster RCT	Eligibility: Danish mothers living in 22 municipalities who gave birth to a single child with gestational age of 37 weeks or more. Total sample: 1595 Total IG: 780 Age: NR Postpartum week at recruitment: Immediate (3 weeks postpartum) Postpartum week at start of intervention: NR	Differences at baseline: No differences Attrition: NR Data collection: Questionnaire Follow up: 6 months Type of outcome: Rates for exclusive BF	Name: None Theoretical framework: Based on psychosocial health education concepts Intensity: 1-3 home visits Length: 5 weeks Delivered by: Health visitors Training: 18 hour training course, based on the WHO training. Control: The health visitors were not blinded but did not take part in the training course. Mothers were offered the health visitor's usual practice consisting of one or more non-standardized visits.	Primary - At six months after delivery 59 mothers (7.7%) in the IG were still exclusively BF compared to 40 (4.9%) in the CG. Secondary - IG mothers had significantly lower cessation rates - In the IG, multiparous mothers with previously short BF experience had a significantly higher score.	None
Labarere 2005 Location: France	Eligibility: Women who delivered a healthy singleton and were BF on	Differences at baseline: No differences	Name: EMS (Extended midwifery support)	Primary - Rates of exclusive BF significantly higher for IG	Fidelity seemed good. 79.3% of those randomized to

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Study period: Oct 2001-May 2002 Research design: RCT	day of discharge from hospital Total sample: 231 Total IG: 116 Age: IG: 29.3 (4.1); CG: 29.7 (4.8) Postpartum week at recruitment: Immediate (on discharge) Postpartum week at start of intervention: Immediate (within 2 weeks postpartum)	Attrition: 5 Data collection: physicians completed questionnaire after intervention (routine preventative meeting within 2 weeks postpartum) Follow up: 4 and 26 weeks Type of outcome: Rates for exclusive BF	Theoretical framework: None Intensity: 1 outpatient visit Length: 1 visit (4 weeks) Delivered by: Trained primary care physicians Training: 5-hour training programme delivered in 2 parts, 1-month prior to start of study. Based on guidelines and review articles. Control: usual care including verbal encouragement for maternity ward staff, assessment and evaluation of successful BF by paediatrician on day of discharge, telephone number for peer support group, mandatory routine, preventative outpatient visits at 1,2,3,4,5,and 6 months	at 4 weeks. No difference between groups on rate of mixed BF at 4 weeks, - Median length of BF higher in IG (18 weeks compared to 13 weeks in CG). Secondary - Mothers in IG were less likely to report mixed BF difficulties	IG attended the extra outpatient appointment with clinician.
McDonald 2010	Eligibility: Women aged over 18 who	Differences at baseline:	Name: EMS (Extended	Primary	Acceptable.

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Location: Australia Study period: Mar 2001-Oct 2001 Research design: RCT	gave birth at the hospital site, singleton pregnancy, intending to breastfeed Total sample: 849 Total IG: 425 Age: 58% aged between 25-35 Postpartum week at recruitment: Immediate (at least 24 hours after delivery but during postpartum hospital stay) Postpartum week at start of intervention: Immediate	No differences Attrition: 67 Data collection: Questionnaires, diaries, follow up phone call with researcher of forms not returned Follow up: 2 and 6 months Type of outcome: Rates for exclusive and mixed BF	midwifery support) Theoretical framework: None Intensity: Hospital session, twice weekly phone calls on discharge, weekly home visits until baby 6 weeks old Length: 6 weeks Delivered by: Midwives Training: Standard BF education plus extra professional development Control: Standard care (one or more midwife visits at home until baby 7 days old, access to lactation consultant)	- No significant differences on mixed, full or exclusive BF between groups. Secondary - Reasons for cessation across groups = younger maternal age, smoking in pregnancy, introduction of artificial milk in hospital, mothers return to work before 6 months, use of analgesia in childbirth	
McLachlan 2016 Location: Australia Study period: Jul 2012-Mar 2013	Eligibility: Eligible local government areas with women who were at risk of early BF cessation as measured by own assessment tool. Total sample: 7039 (99 clusters)	Differences at baseline: Higher proportion of Australian born mothers in CG and IG2.	Name: Supporting BF in Local Communities (SILK) Theoretical framework: None Intensity: Not clear: Number of	Primary - No significant differences between groups at 4 months, 3 and 6 months for mixed BF in last 24 hours.	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Research design: Clustered RCT	Total IG: 2 intervention groups. IG1: 3 LGAs, 32 clusters, 2281 women. IG2: 3 LGAs, 26 clusters, 2344 women Age: IG1: 31.1 (5), IG2: 31.4 (5.1), CG: 30.7 (5.3) Postpartum week at recruitment: Immediate (1 week) Postpartum week at start of intervention: Immediate (1 week)	Attrition: CG: 1035, IG1: 1054 , IG2: 547 Data collection: Interviews Follow up: 3, 4 and 6 months Type of outcome: Rates for mixed BF	visits by community nurses tailored to support women needs. Number of visits to BF cafes was up to the women. Length: 9 months Delivered by: Maternal and Child Health Nurses Training: NR Control: Usual care: nurse visit 10-14 days after birth, BF support key component, MCH centre based care and helplines available. May have also received BF support in hospital.	Secondary - Factors associated with no BF at 4 months were <25 years old, Australian born, birth < 37 week gestation, caesarean birth and having health care card	
Porteous 2000 Location: Canada Study period: Jun-Aug 2001 Research design: RCT	Eligibility: Women in the postpartum unit who wished to breastfeed but identified themselves as bing without support Total sample: 51 Total IG: 26 Age: NR	Differences at baseline: No differences Attrition: 1 Data collection: Telephone questionnaire	Name: None Theoretical framework: None Intensity: Daily visits while in hospital and phone call 72 hours following discharge. Then weekly phone calls until 4 weeks	Primary - Significant improvement at 4 weeks and 100% of IG continued to BF. 22 exclusively.	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Postpartum week at recruitment: Immediate Postpartum week at start of intervention: Immediate	Follow up: 4 weeks Type of outcome: Duration for exclusive and mixed BF	postpartum, home visit one week after discharge and further home visits available 'as required' Length: 4 weeks Delivered by: Research team member (community midwife) Training: NR Control: Conventional care by member of care team. Includes assistance with positioning, discussion of BF issues, length of feeds, supplementation with formula, nipple shields and pacifiers. No structured protocol for teaching BF, but support and help available if requested and access to a public health phone line on discharge		
Pugh 2010 Location: U.S.A.	Eligibility: Breastfeeding mothers of full-term infants who	Differences at baseline: No differences	Name: The Breastfeeding support team	Primary - Significantly higher BF rates in IG at	Seemed acceptable based on pilot work.

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Study period: NR Research design: RCT	were eligible for WIC, from 2 urban hospitals Total sample: 328 Total IG: 168 Age: 23.1 (5.3), IG: 23.1 (5.3) CG: 23.2 (5.3) Postpartum week at recruitment: Immediate >48 hours postpartum Postpartum week at start of intervention: NR	Attrition: 34 (21 in IG and 13 in CG) Data collection: Face to face and follow-up phone call Follow up: 6, 12 and 24 weeks Type of outcome: Rates for exclusive BF	Theoretical framework: None Intensity: >5, varied according to individual need and clinical judgment Length: NR Delivered by: Community nurse and peer supporter Training: NR Control: Lactation consultant visit in hospital and access to helpline after discharge	6 weeks, non-significant but higher at 12 weeks and no differences at 24 weeks.	
Schy 1996 Location: U.S.A. Study period: Dec 1991-Apr 1993 Research design: RCT	Eligibility: Women planning to BF, with a lactation specialist available, a baby 37 weeks gestation or more, aged 16 or above, with present delivery being the first BF experience and a home telephone available Total sample: 150 Total IG: 75 Age: 28 (4.5)	Differences at baseline: Women in CG less likely to be married, less likely to have been previously pregnant, less likely to have other children. Attrition: NR Data collection: Monthly phone calls, BF	Name: None Theoretical framework: None Intensity: Lactation session in hospital, then daily follow up while in hospital (on average 2 days for vaginal delivery and 4 days for caesarean delivery) Length: NR (postpartum hospital stay)	Primary - No significant differences on exclusive BF Secondary - No significant differences between groups in BF satisfaction scores - Looking at whole group as a cohort, duration of BF was statistically correlated to	Acceptable intervention but contamination as high number of women in CG also spoke to lactation consultant, even if much more briefly.

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	Postpartum week at recruitment: Immediate (within 24 hours of vaginal delivery, within 48 hours of cesarean delivery) Postpartum week at start of intervention: Immediate (during hospital stay)	satisfaction questionnaire at 6 months Follow up: 6 months Type of outcome: Duration for exclusive BF	Delivered by: Lactation consultant Training: NR Control: Standard care from staff nurses and one off appointment with lactation consultant if required (mostly brief, focused on problem solving)	mothers perceived level of satisfaction, educational level, and expected length of BF	
Tahir 2013 Location: Malaysia Study period: Apr 2010-Feb 2011 Research design: RCT	Eligibility: Women 18 years of age or older, of Malaysian nationality, had delivered a single infant at 37 or more weeks of gestation, intended to breastfeed and able to understand and communicate in spoken Malay or English. Total sample: 357 Total IG: 179 Age: M = 28.58 (5.51), IG: M = 28.45 (4.29), CG: 23.68 (4.43) Postpartum week at recruitment: Immediate (1	Differences at baseline: CG had higher prenatal medical problems (higher in CG) and less male infants Attrition: 10.9% (7.56%, 2.73% and 0.93% at the first, fourth and sixth months respectively). Data collection: Questionnaire Follow up: 1, 4 and 6 months	Name: None Theoretical framework: None Intensity: 12 lactation sessions Length: 6 months Delivered by: Lactation counsellors (nurses with midwifery training) Training: The 12 lactation counsellors had undergone a 40 hour lactation management and counselling course based on the WHO module and were given training guidance on how lactation counselling	Primary - Exclusive BF rate at the first month postpartum was 79.6%. It dropped to 40.5% and 12.3% at the fourth and sixth months postpartum - At the first month postpartum, a higher number of mothers in the intervention group practiced exclusive BF compared to mothers in the control group (84.3% vs. 74.7%) with a small effect size (phi	Well received by the mothers at the beginning of the study, but the positive response to the intervention declined. The average of total minutes for each call per participant was 58.4 38.5 min (range = 0–210 min), while the average number of successful calls per participant was only 4.33 3.14 times/particip

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
	week postpartum) Postpartum week at start of intervention: NR	Type of outcome: Rates for exclusive BF	should be performed, lactation counselling guideline booklets, standard operation procedure booklet, and a telephone call log-book for each patient. Control: Current conventional care for postnatal breastfeeding promotion, self-support or a public healthcare provider. This conventional care included breastfeeding talks during immunization follow-ups, information or pamphlets during antenatal or postnatal follow-ups, and advice regarding breastfeeding.	= 0.12). At fourth and sixth months postpartum there was no statistical difference (42.0% vs. 39.0%; 12.5% vs. 12.0%, respectively). Secondary - No difference between groups in terms of stopping BF.	ant (range 0–12 times).
Washio 2017 Location: U.S.A. Study period: Feb 2015-Feb 2016	Eligibility: Self-identify as Puerto Rican, plan to stay in area 6 months postpartum, speak Spanish or English, and be enrolled in nutrition program	Differences at baseline: No differences Attrition: 0 Data collection: Questionnair	Name: None Theoretical framework: None Intensity: Incentives given at various time points	Primary - Higher proportion of mothers at each time point BF in IG - Longer duration of BF for IG	None

Study information	Participant information	Research information	Intervention information	Key findings:	Evaluation (feasibility)
Research design: RCT	for women, initiated BF. Total sample: 36 Total IG: 18 Age: IG: 24.1 (4.7) CG: 23 (4.6) Postpartum week at recruitment: Immediate (within 2 weeks) Postpartum week at start of intervention: Immediate (within 1 month)	es including BF attitude, BF self-efficacy. Visual verification of BF. Follow up: 1, 3 and 6 months Type of outcome: Rates for mixed BF	Length: 6 months Delivered by: Researcher Training: NR Control: Standard BF services - access to lactation consultant, peer counselling, and peer support meetings, breast pump, enhanced food package for mothers.	Secondary - Less supplementation at T1 and T2 for IG - No significant differences in babies' weight or admission to A & E.	

Notes. BF = Breastfeeding; CG = Control Group; IG = Intervention Group; NR = Not reported; RCT = Randomised Controlled Trail; WHO =World Health Organisation.

Table A2

The Behaviour Change Techniques (BCTs) Used per Included Study (N = 23)

Study	n	1.2 Problem solving	1.3 Goal setting (outcome)	1.4 Action planning	1.5 Review behaviour goal	1.7 Review outcome goal	1.9 Commitment	2.2 Feedback on behaviour	2.3 Self-monitoring behaviour	2.4 Self-monitoring outcome	2.7 Feedback on outcomes	3.1 Social support (unspecified)	3.2 Social support (practical)	3.3 Social support (emotional)	4.1 Instruction on how to perform the	5.1 Information about health consequences	5.3 Information about social environmental	5.4 Monitoring of emotional consequences	5.6 Information about emotional	6.1 Demonstration of the behaviour	7.1 Prompts/cues	7.5 Remove aversive stimulus	8.1 Behavioral practice/rehearsal	9.1 Credible source	9.2 Pros and cons	10.1 Material incentive	10.2 Material reward	11.2 Reduce negative emotions	12.5 Adding objects to the environment	15.1 Verbal persuasion about capability
Abbass-Dick, 2015	5											■			■					■	■			■						
Ahmed, 2016	6	■						■			■	■			■									■						
Aksu, 2011	6	■													■		■			■				■	■					
Albert, 2011	2																					■							■	
Bica, 2014	4							■				■			■		■													
Dennis, 2002	3												■	■										■						
Frank, 1987	3											■												■					■	
Fu, 2014	8	■						■							■	■			■	■			■	■						

Study	Gigliotti, 2015	Grossman, 1990	Gu, 2016	Henderson, 2001	Kang, 2008	Khresheh, 2011	Kronborg, 2007	Laberere 2005	McDonald, 2010	McLachlan, 2016	Portous, 2000
n	3	6	7	5	14	5	6	1	5	3	4
1.2 Problem solving		■			■				■		■
1.3 Goal setting (outcome)					■						
1.4 Action planning					■					■	
1.5 Review behaviour goal					■						
1.7 Review outcome goal					■						
1.9 Commitment					■						
2.2 Feedback on behaviour				■		■	■				■
2.3 Self-monitoring behaviour					■		■				
2.4 Self-monitoring outcome							■				
2.7 Feedback on outcomes											
3.1 Social support (unspecified)	■		■		■		■		■		■
3.2 Social support (practical)			■		■				■		
3.3 Social support (emotional)											
4.1 Instruction on how to perform the	■	■	■	■	■	■	■	■			
5.1 Information about health consequences					■						
5.3 Information about social environmental		■	■			■			■		
5.4 Monitoring of emotional consequences					■						
5.6 Information about emotional											
6.1 Demonstration of the behaviour		■	■	■		■					
7.1 Prompts/cues											
7.5 Remove aversive stimulus											
8.1 Behavioral practice/rehearsal		■	■	■		■					
9.1 Credible source					■						
9.2 Pros and cons											
10.1 Material incentive											
10.2 Material reward											
11.2 Reduce negative emotions							■				
12.5 Adding objects to the environment											
15.1 Verbal persuasion about capability					■						

Study	n	1.2 Problem solving	1.3 Goal setting (outcome)	1.4 Action planning	1.5 Review behaviour goal	1.7 Review outcome goal	1.9 Commitment	2.2 Feedback on behaviour	2.3 Self-monitoring behaviour	2.4 Self-monitoring outcome	2.7 Feedback on outcomes	3.1 Social support (unspecified)	3.2 Social support (practical)	3.3 Social support (emotional)	4.1 Instruction on how to perform the	5.1 Information about health consequences	5.3 Information about social environmental	5.4 Monitoring of emotional consequences	5.6 Information about emotional	6.1 Demonstration of the behaviour	7.1 Prompts/cues	7.5 Remove aversive stimulus	8.1 Behavioral practice/rehearsal	9.1 Credible source	9.2 Pros and cons	10.1 Material incentive	10.2 Material reward	11.2 Reduce negative emotions	12.5 Adding objects to the environment	15.1 Verbal persuasion about capability
Pugh, 2010	3																													
Schy, 1996	3																													
Tahir, 2013	1																													
Washio, 2017	2																													
Total		9	1	2	1	1	1	7	2	1	1	11	4	1	13	2	7	1	1	7	1	1	5	17	1	1	1	1	2	2

Note. EBF = exclusive breastfeeding; MBF = mixed breastfeeding.

BCTs are provided with a black box when coder provided a high confidence rating ('++') and with a grey box when coder provided with a lower confidence rating ('+).

For Labarere et al (2005) other BCTs apart from *credible source* were apparent but not coded because they were not consistent as intervention was individualised dependent on need.

For McLachlan (2016), *action planning* was administered 'if needed'.

References of studies included in the review

Abbass-Dick, J., Stern, S. B., Nelson, L. E., Watson, W., & Dennis, C.-L. (2015). Coparenting breastfeeding support and exclusive breastfeeding: a randomized controlled trial. *Pediatrics*, *135*, 102–110. doi: 10.1542/peds.2014-1416.

Ahmed, A. H., Roumani, A. M., Szucs, K., Zhang, L., & King, D. (2016). The effect of interactive web-based monitoring on breastfeeding exclusivity, intensity, and duration in healthy, term infants after hospital discharge. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *45*(2), 143–154.

Aksu, H., Küçük, M., & Düzgün, G. (2011). The effect of postnatal breastfeeding education/support offered at home 3 days after delivery on breastfeeding duration and knowledge: a randomized trial. *The Journal of Maternal-Fetal & Neonatal Medicine*, *24*(2), 354–361.

Albert, J., & Heinrichs-Breen, J. (2011). An evaluation of a breastfeeding privacy sign to prevent interruptions and promote successful breastfeeding. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *40*(3), 274–280.

Bica, O. C., & Giugliani, E. R. J. (2014). Influence of counseling sessions on the prevalence of breastfeeding in the first year of life: a randomized clinical trial with adolescent mothers and grandmothers. Birth, 41(1), 39-45.

Dennis, C.-L., Hodnett, E., Gallop, R., & Chalmers, B. (2002). The effect of peer support on breast-feeding duration among primiparous women: a randomized controlled trial. *Canadian Medical Association Journal*, *166*(1), 21–28.

Frank, D. A., Wirtz, S. J., Sorenson, J. R., & Heeren, T. (1987). Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. *Pediatrics*, *80*(6), 845–854.

Fu, I. C. Y., Fong, D. Y. T., Heys, M., Lee, I. L. Y., Sham, A., & Tarrant, M. (2014). Professional breastfeeding support for first-time mothers: a multicentre cluster randomised controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, *121*(13), 1673–1683.

Giglia, R., Cox, K., Zhao, Y., & Binns, C. W. (2015). Exclusive breastfeeding increased by an internet intervention. Breastfeeding Medicine, 10(1), 20-25.

Grossman, L. K., Harter, C., Sachs, L., & Kay, A. (1990). The effect of postpartum lactation counseling on the duration of breast-feeding in low-income women. American journal of diseases of children, 144(4), 471-474.

Gu, Y., Zhu, Y., Zhang, Z., & Wan, H. (2016). Effectiveness of a theory-based breastfeeding promotion intervention on exclusive breastfeeding in China: A randomised controlled trial. *Midwifery*, *42*, 93–99.

Henderson, A., Stamp, G., & Pincombe, J. (2001). Postpartum positioning and attachment education for increasing breastfeeding: a randomized trial. Birth, 28(4), 236-242.

Kang, J. S., Choi, S. Y., & Ryu, E. J. (2008). Effects of a breastfeeding empowerment programme on Korean breastfeeding mothers: a quasi-experimental study. *International Journal of Nursing Studies*, *45*(1), 14–23.

Khresheh, R., Suhaimat, A., Jalamdeh, F., & Barclay, L. (2011). The effect of a postnatal education and support program on breastfeeding among primiparous women: a randomized controlled trial. International journal of nursing studies, 48(9), 1058-1065.

Kronborg, H., Vaeth, M., Olsen, J., Iversen, L., & Harder, I. (2007). Effect of early postnatal breastfeeding support: a cluster-randomized community based trial. *Acta Paediatrica*, *96*(7), 1064–1070.

Labarere, J., Gelbert-Baudino, N., Ayral, A. S., Duc, C., Berchotteau, M., Bouchon, N., Schelstraete, C., Vittoz, J.P., Francois, P. & Pons, J. C. (2005). Efficacy of breastfeeding support provided by trained clinicians during an early, routine, preventive visit: a prospective, randomized, open trial of 226 mother-infant pairs. Pediatrics, 115(2), e139-e146.

McDonald, S. J., Henderson, J. J., Faulkner, S., Evans, S. F., & Hagan, R. (2010). Effect of an extended midwifery postnatal support programme on the duration of breast feeding: a randomised controlled trial. *Midwifery*, *26*(1), 88–100.

McLachlan, H. L., Forster, D. A., Amir, L. H., Cullinane, M., Shafiei, T., Watson, L. F., Ridgway, L., Cramer, R.L., Small, R. (2016). Supporting breastfeeding In Local Communities (SILC) in Victoria, Australia: a cluster randomised controlled trial. *BMJ Open*, *6*(2), e008292.

Porteous, R., Kaufman, K., & Rush, J. (2000). The effect of individualized professional support on duration of breastfeeding: a randomized controlled trial. *Journal of Human Lactation*, *16*(4), 303–308.

Pugh, L. C., Serwint, J. R., Frick, K. D., Nanda, J. P., Sharps, P. W., Spatz, D. L., & Milligan, R. A. (2010). A randomized controlled community-based trial to improve breastfeeding rates among urban low-income mothers. *Academic Pediatrics*, *10*(1), 14–20.

Schy, D. S., Maglaya, C. F., Mendelson, S. G., Race, K. E., & Ludwig-Beymer, P. (1996). The effects of in-hospital lactation education on breastfeeding practice. Journal of Human Lactation, 12(2), 117-122.

Tahir, N. M., & Al-Sadat, N. (2013). Does telephone lactation counselling improve breastfeeding practices?: A randomised controlled trial. *International Journal of Nursing Studies*, *50*(1), 16–25.

Washio, Y., Humphreys, M., Colchado, E., Sierra-Ortiz, M., Zhang, Z., Collins, B. N., Kilby, L.M., Chapman, D.J., Higgins, S.T., Kirby, K. C. (2017). Incentive-based intervention to maintain breastfeeding among low-income Puerto Rican mothers. *Pediatrics*, e20163119.

Supplemental Material (data used in analyses)

Please see here: https://osf.io/2uzkf/ for raw data and Syntax Commands