

REVIEW ARTICLE

A realist review of one-to-one breastfeeding peer support experiments conducted in developed country settings

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Abstract

The World Health Organisation guidance recommends breastfeeding peer support (BFPS) as part of a strategy to improve breastfeeding rates. In the UK, BFPS is supported by National Institute for Health and Care Excellence guidance and a variety of models are in use. The experimental evidence for BFPS in developed countries is mixed and traditional methods of systematic review are ill-equipped to explore heterogeneity, complexity, and context influences on effectiveness. This review aimed to enhance learning from the experimental evidence base for one-to-one BFPS intervention. Principles of realist review were applied to intervention case studies associated with published experimental studies. The review aimed (a) to explore heterogeneity in theoretical underpinnings and intervention design for one-to-one BFPS intervention; (b) inform design decisions by identifying transferable lessons developed from cross-case comparison of context-mechanism-outcome relationships; and (c) inform evaluation design by identifying context-mechanism-outcome relationships associated with experimental conditions. Findings highlighted poor attention to intervention theory and considerable heterogeneity in BFPS intervention design. Transferable mid-range theories to inform design emerged, which could be grouped into seven categories: (a) congruence with local infant feeding norms, (b) integration with the existing system of health care, (c) overcoming practical and emotional barriers to access, (d) ensuring friendly, competent, and proactive peers, (e) facilitating authentic peer-mother interactions, (f) motivating peers to ensure positive within-intervention amplification, and (g) ensuring positive legacy and maintenance of gains. There is a need to integrate realist principles into evaluation design to improve our understanding of what forms of BFPS work, for whom and under what circumstances.

KEYWORDS

breastfeeding, complex interventions, evaluation, infant feeding, peer support, realist review

1 | INTRODUCTION

The idea that the beliefs, behaviours, and attitudes of social peers make a difference to mothers' feeding decisions in high income country settings is justified by extensive evidence (McFadden & Toole, 2006; McInnes, Hoddinott, Britten, Darwent, & Craig, 2013). Women who are encouraged to breastfeed by key social network members are more likely to start and continue for longer (Avery, Zimmermann, Underwood, & Magnus, 2009), and in the UK, women who have friends who have breastfed are more likely to breastfeed their own baby (McAndrew et al., 2012). Negative or mixed messages from partners, family, friends, and health professionals can undermine breastfeeding decisions (Larsen, Hall, & Aagaard, 2008; McInnes et al., 2013). Furthermore, feeding

intention and breastfeeding self-efficacy have been found to be interrelated with social support (Brown, 2013).

1.1 | Breastfeeding peer support

International and UK national-level recommendations support the use of breastfeeding peer support (BFPS) to increase breastfeeding rates (WHO, 2003; NICE, 2005, 2008). Peer support interventions are intended to "extend natural embedded social networks and complement professional health services" (Dennis, 2003, p. 322). In her concept analysis of peer support interventions delivered in a health care setting, Dennis defined this form of intervention as "the provision of emotional, appraisal and informational assistance by a created social network member

who possesses experiential knowledge of a specific behaviour or stressor and similar characteristics as the target population" (p. 329). In her review of UK-based BFPS interventions, Dykes (2005) describes breastfeeding peer support schemes as "recruiting a group of local women, who have breastfed their babies, to undertake a short programme of training ... who are then engaged in supporting breastfeeding women within their local communities in a range of ways and via a number of access points." Dennis points out that a continuum runs between professional and lay support and that peer supporters working across different interventions have different levels of training and are integrated to different extents with existing systems of care. Dykes's review includes interventions that are not directly related to professional caregiving or to an existing care pathway. Both definitions leave room for considerable variation in intervention form and in theoretical underpinnings.

Peer support is a notoriously undertheorised intervention form (Turner & Shepherd, 1999). However, several theories operating at the level of the relationship between the individual and the peer are considered relevant. The notion that information will be more credible and be more acceptable if the recipient perceives the giver as similar to themselves is conceptualised by the *principle of homophily* (McPherson, Smith-Lovin, & Cook, 2001). *Social Learning Theory* (Bandura, 1986) suggests that individuals compare themselves with others who occupy a social role to which they aspire and learn through mechanisms of observation, imitation, and modelling. *The theory of social support* (Barnes, 1954; Cassel, 1976) provides a framework for explaining the ways in which social networks help individuals manage stressful events. Four types of social support have been distinguished (House, 1981): *informational support* involves advice and suggestions; *emotional support* comes from sharing life experiences and providing empathy, love, and care, built on relationships of trust; *instrumental support* consists of providing tangible aid and services; and *appraisal support* facilitates self-evaluation through constructive feedback. Intervention theorists also distinguish between *perceived support*, the sense a mother has that the help will be there if she needs it, and *received support*, the help that occurs as a direct result of interaction (Dennis, 2002).

The evidence base for BFPS is mixed. A Cochrane review of additional support (provided by professionals, peer supporters, or both) based on 57 trials, including 37 from high income countries found that any extra support (irrespective of provider) had a positive effect on breastfeeding duration rates (Renfrew, McCormick, Wade, Quinn, & Dowswell, 2012). Interventions tended to be more effective when delivered in areas with higher background initiation rates, delivered face-to-face, offered proactively, offered on an on-going basis, and when tailored to the needs of the target population (Renfrew et al., 2012). A recent Cochrane review reported similar findings (McFadden et al., 2017). A systematic review including 11 randomised controlled trials (RCTs) of BFPS found that interventions targeting women with a prior intention to breastfeed were more likely to lead to increases in breastfeeding initiation rates compared to universal BFPS interventions (Ingram, MacArthur, Khan, Deeks, & Jolly, 2010). A systematic review of 17 RCTs, including a meta-regression of 15 RCTs, concluded that BFPS interventions improved breastfeeding maintenance in low or middle income countries but had less impact in high-income countries (Jolly, Ingram, Khan, et al., 2012). This review found that less intensive interventions (<5 planned contacts) had no

Key messages

- Peer support interventions are under-theorised and display heterogeneity. This problematises learning from traditional evidence syntheses.
- Breastfeeding peer support interventions rely on a chain of mechanisms firing in sequence. Interventions must address societal norms and the health service context to avoid implementation failure.
- We present a thinking tool to improve likelihood of breastfeeding peer support interventions being implemented, accepted and valued.
- Experimental conditions can exacerbate implementation failure mechanisms. Evaluation strategies should incorporate realist principles.
- There is no overarching theory of change for infant feeding behaviours at community level, making it difficult for intervention planners to target peer interventions for maximum benefit.

impact on breastfeeding duration. Interventions that combined antenatal and postnatal contact tended to be ineffective, whereas postnatal-only interventions were associated with improved breastfeeding durations (Jolly, Ingram, Khan, et al., 2012). Further experimental studies to assess the effectiveness of BFPS in high-income countries have been recommended (Hoddinott, Seyara, & Marais, 2011; Jolly, Ingram, Khan, et al., 2012).

1.2 | The case for realist review

Challenged by mixed evidence from systematic reviews and concerned about the potential for inconsistent definition of BFPS, two of the authors [GT and HT] carried out a scoping review of RCT BFPS study papers (Thomson & Trickey, 2013). This scoping review indicated high rates of implementation failure and suggested that intervention designs were varied and complicated in ways that category-based analysis in systematic reviews had failed to fully address. The discussion sections of several study papers hinted at complex interactions between health professionals, peers, and mothers that may have influenced outcomes. Given this complexity, the authors recommended that realist principles should be applied to enhance the potential to inform intervention design (Thomson & Trickey, 2013).

Realist approaches are based on an understanding that it is not meaningful to try to separate out complex interventions, such as peer support, from their delivery contexts (Pawson, Greenhalgh, Harvey, & Walsh, 2005). Realist evaluators look for interactions among the setting's resources (e.g., interactions between people, their physical environment, their funding context, and existing policy context, with a focus on observing the impact of new resources introduced or removed by the intervention) to identify *generative mechanisms* (changes in people's feelings or beliefs caused by the introduction

of the intervention) that lead them to act in ways that they would not otherwise have done (Wong, Greenhalgh, Westhorp, Buckingham, & Pawson, 2013, p. 6). These relationships are described as *context-mechanism-outcome* (CMO) relationships, where the context is the components of the existing setting plus the new resources provided by the intervention, the mechanism is the reasoning or response of the participants, leading to outcomes, which are the intended and unintended consequences of intervention.

Realist reviewers draw on a range of sources understand interactions between generative mechanisms and the intervention context in each of the intervention cases they study. Sources include discussion sections of study papers, qualitative studies, and process evaluations, as well as conversations with those responsible for designing, delivering, or evaluating the intervention. A method of constant comparison between CMOs identified in different intervention cases is used to develop mid-range theories about how interventions do (or do not) work in different contexts and to draw transferable lessons. Realist reviewers frequently work forwards from identifying potential theories about how interventions do (or do not) work, to exploring the evidence to test identified theories across different contexts (Pawson et al., 2005). Principles of realist review are sometimes reverse-applied to articulate CMO relationships in intervention studies that have contributed to existing systematic reviews. For example, this approach has been used to enhance interpretation from experimental studies of school feeding programmes that had contributed to a Cochrane review (Greenhalgh, Kristjansson, & Robinsonlook, 2007).

Our realist review was intended to inform intervention development and an experimental evaluation strategy for a UK-based one-to-one care pathway BFPS intervention for mothers of full-term babies (Paranjothy et al., 2017, in press). A realist review of community-based peer support interventions (BFPS being one of the included forms) to increase health literacy and reduce health inequality (addressing a range of health issues) has been conducted (Harris et al., 2015). However, the Harris et al. (2015) review did not encompass the 'one-to-one' breastfeeding peer support experiments that had contributed to influential systematic reviews. We anticipated that CMO relationships might operate differently in one-to-one delivery settings compared to group-based settings and also that different CMO relationships might emerge under experimental conditions.

To summarise the rationale for our review, we began with an understanding that existing systematic reviews were drawing together findings from an undertheorised intervention form. The team felt that an in-depth application of principles of realist review to the experimental evidence base undertaken in high income country contexts would add valuable insights over and above those identified by Harris et al. (2015) and would inform the design of one-to-one BFPS in the future. The review team therefore agreed to conduct a realist review with boundaries defined both by intervention form (one-to-one BFPS interventions) and by method of evaluation (experimental design). The team then worked iteratively to explore theories underpinning a set of intervention cases falling within the boundaries of the review and to extract CMO relationships for one-to-one BFPS delivered under experimental conditions.

The aims of the review were agreed as follows:

1. To explore heterogeneity in theoretical underpinnings and in intervention design among one-to-one BFPS interventions;
2. To inform design decisions by identifying transferable lessons developed from cross-case comparison of CMO relationships; and
3. To inform evaluation design by identifying CMO relationships associated with experimental conditions.

2 | METHODOLOGICAL APPROACH

The steps for realist synthesis set out in Pawson, Greenhalgh, Harvey, and Walshe (2004) were followed.

2.1 | Scope

The review included BFPS intervention cases associated with an experimental study published between the start of January 2000 and end of January 2016, which had breastfeeding (initiation, continuation, or exclusivity) as the primary outcome among full term babies in high income country settings. Interventions were included if they primarily intended a one-to-one (peer-to-mother) model of support and excluded if the support was primarily intended to be group-based. The cut-off of year 2000 was chosen to prioritise more recently evaluated interventions, as the team believed these would have greater relevance to current delivery contexts.

2.2 | Evidence gathering

The unit of analysis for the review was the intervention case. Evidence gathering was conducted in two stages.

- A search for index experimental studies was conducted using the following databases: ASSIA, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), Embase, ERIC, HMIC, Medline, Medline in process, Scopus, Social Services Abstracts, Sociological Abstracts, and Web of Knowledge. We also searched the Unicef UK Baby Friendly Initiative website, key journals (*Breastfeeding Medicine*, *Journal of Human Lactation*, *Maternal and Child Nutrition*, *Midwifery*) and two trial registers ClinicalTrials.com and metaRegister of Controlled Trials. The search was limited to English language only and publication years 2000–2016 (PRISMA flow diagram is presented in Figure 1).
- Intervention cases were developed from the index experimental study papers, drawing in process evaluations, qualitative studies, secondary analyses, intervention protocols, training manuals, and correspondence with the study authors where possible. Study paper reference lists were scanned; supplementary searches were conducted based on the name of the intervention and the lead author.

2.3 | Quality appraisal

Quality assessment of assembled case materials was conducted to assess suitability of each included case for realist review. Quality was considered compromised where the following were lacking: (a)

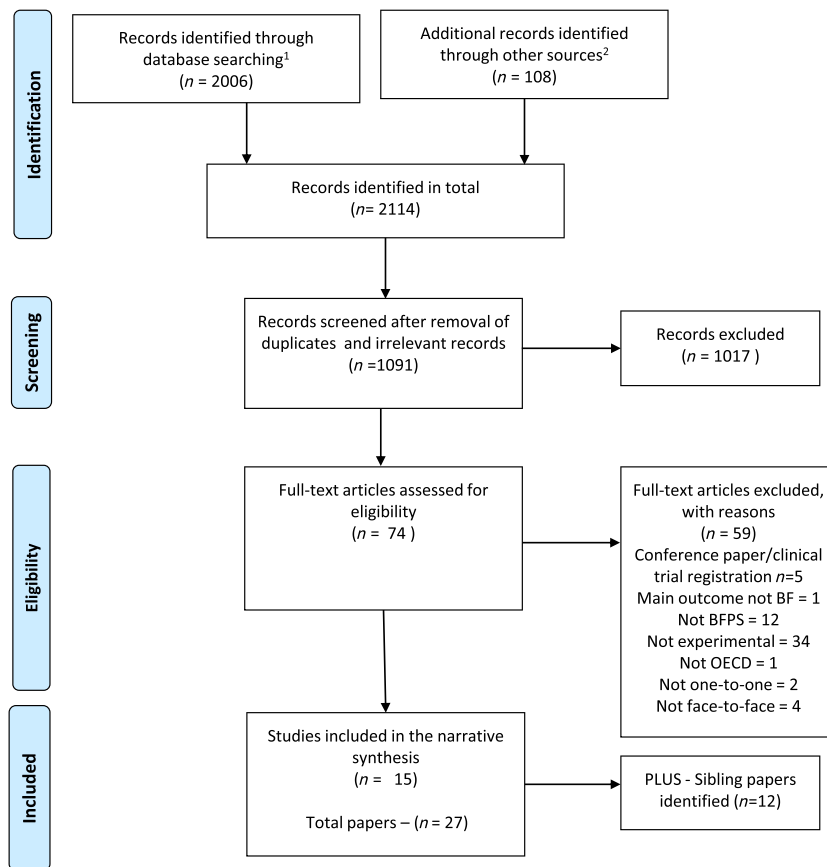


FIGURE 1 PRISMA diagram—Identification of index experimental study papers

description of intervention theory, (b) description of intervention components, (c) a description of the infant feeding and health service context, (d) description of implementation, take-up, and fidelity issues, (e) existence of process evaluation, and (f) congruence between measured outcomes and intervention theory.

2.4 | Data extraction

The following data were extracted for each intervention case:

- The intended intervention: The components: timing and setting, characteristics of peers, and the intervention goals (initiation, continuation, and exclusivity). The target population: age, income, ethnicity and prior feeding intention, inclusion and exclusion criteria, and timing of recruitment. The intervention theory. Theory elicitation was approached from two directions. First, reviewers extracted all cited theories and explicit descriptions of theories of change. Second, we drew on the approach proposed by Leeuw (2003), we looked for “groups of relational statements about peer support that were used to describe, explain predict or control the intervention” (Harris et al., 2015, p. 35), we reconstructed theoretical assumptions by working backwards from descriptions of the intervention components or methods.
- The delivery and usual care context: location, infant feeding context (background rates), socio-economic context, existing policies, and systems of care.
- The intended experiment: the main goal of the experiment, outcomes measured, type of experiment, study size, and an

assessment of risk of bias using Cochrane criteria (Higgins & Green, 2011).

- Inferred CMO relationships: Each intervention case was reviewed separately by two reviewers. Each reviewer produced descriptions of context-mechanism relationships that appeared to have contributed to outcomes. “Outcomes” were consequences experienced by any actor—mother, peer, health professional, study manager, study researcher. Outcomes included formal outcomes (e.g., breastfeeding rates), intermediate outcomes (e.g., feeding intention; changes in knowledge, attitudes, or beliefs), process outcomes (e.g., mother–peer contacts achieved; duration of contacts), secondary outcomes (e.g., experience, satisfaction), unintended outcomes (e.g., programme disengagement), and outcomes that tended to feedback into the intervention or intervention context (e.g., peer motivation; approval for continued funding). For each CMO relationship described, the review team recorded the source and degree of inference (e.g., observed association, process evaluation findings, author’s inference, and reviewer’s inference).

All review team members reviewed case material relating to at least two interventions; to ensure consistency, one author reviewed all 15 intervention cases. Descriptive case tables were produced to facilitate comparison.

2.5 | Cross-case comparison, synthesis, and lessons

A master list of CMO relationships was developed, enabling thematic grouping of sets of CMOs and cross-case comparisons. Drawing on

the approach used by Harris et al. (2013) we developed statements to summarise emerging patterns. The team discussed the evidence (and counter-evidence) statements to inform future intervention design.

3 | RESULTS

Fifteen intervention cases were identified from 16 index experimental study papers, using the search strategy and eligibility criteria as described in Figure 1. Nine interventions were delivered in the USA, all associated with the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Chapman, Damio, Young, & Perez-Escamilla, 2004; Anderson et al., 2005; Di Meglio et al., 2010; Gross et al., 2009; Yun et al., 2010; Olson et al., 2010; Chapman et al., 2013; Reeder et al., 2014; Srinivas et al., 2015). Six study papers (Graffy, Taylor, Williams, & Eldridge, 2004; Jolly, Ingram, Freemantle, et al., 2012; McArthur et al., 2009; McInnes, Love, & Stone, 2000; Muirhead, Butcher, Rankin, & Munley, 2006; Scott, Pritchard, & Szatkowski, 2017) related to five UK-based interventions, and one study paper related to an intervention delivered in Canada (Dennis, Hodnett, Gallop, & Chalmer, 2002).

3.1 | The index study papers

For the index study papers, intervention goals, outcome measures, implementation issues, observed effectiveness, and experimental quality are presented in Table 1. Only six of the 15 BFPS experiments reported that the BFPS interventions were effective for increasing breastfeeding. Interventions were assigned a case number, as shown in Table 1, based on date of publication of the first associated experiment. Herein, case numbers are used to when referring to the interventions.

Eleven index experimental study papers associated with 10 interventions (Cases 2–7, 10, and 12–14) described RCTs. One intervention was evaluated using a quasi-experimental study design (Case 1), whereas four intervention cases were natural experiments (Cases 8, 9, 11, and 15). Applying Cochrane risk of bias criteria (Higgins & Green, 2011), the review team found that only two studies had low risk of bias (Cases 3 and 5). More than half the evaluations were at risk of selection bias (Cases 1, 2, 8–11, and 15), attrition may have affected five evaluations (Cases 4, 6, 7, 9, and 13), and the evaluation associated with Case 14 was at risk of detection bias. Implementation issues affected 10 of the 15 intervention cases. Among the five UK intervention cases, there were difficulties in achieving the intended number of contacts (Cases 1, 3, 7, and 15) and in ensuring intervention fidelity (Cases 6 and 7). Of the nine studies of US-based cases, five reported significant implementation problems (Cases 4, 10 and 12–14).

3.2 | The quality of the intervention cases

The case-based supplementary evidence-gathering process yielded additional contributing information pertaining to 14/15 cases. The cases varied in their suitability to contribute to realist review, as described in Table 2. Intervention theory was poorly specified in 13/15 intervention cases. It was possible to obtain a description of the intervention components for all but one intervention case (Case 9). All the cases contained some description of the infant feeding context; however, descriptions of the wider social and health service

context were often incomplete. Information about implementation could not be obtained for Cases 8 and 9 and was incomplete for Cases 11 and 12.

3.3 | Heterogeneity and the problem addressed

The interventions differed from one another in terms of the problem that was being addressed (see Table 1, Column 3; for a description of the intervention goals). For all 15 interventions the problem of low breastfeeding rates had been identified from a top-down, public health planning perspective, with little or no target community involvement. In Case 1, an action-research approach was used to gain community-level participation in intervention design and delivery; however, the intervention focus on breastfeeding rates had already been set by public health planners. The 15 intervention cases addressed different types and scales of breastfeeding rate problems and, to different extents, sought to overcome or address subsidiary problems; these included problems of maternal motivation, health inequality, complex needs, scarce resources, wider social norms, and an unhelpful health care context.

Nine interventions aimed to increase initiation rates (Cases 1, 4, 6–9, 11, 13, and 15); 13 interventions aimed to improve continuation rates (Cases 1–4, 6–11, and 13–15) measured at varying time points. Four interventions aimed to improve exclusive breastfeeding rates (Cases 5, 12, 13, and 14). The scale of the problem of low rates of breastfeeding varied. Case 1 was implemented against a backdrop of breastfeeding continuation rates of around 10% at 6 weeks, whereas Cases 12 and 13 were both delivered in the context of background initiation rates of 90% (the highest in the county of Oregon) to a low-income population of Latina—predominantly Puerto Rican—women.

Six interventions sought to increase rates regardless of pre-existing levels of motivation (Cases 1, 6–9, and 13); Case 3 included women who were “considering breastfeeding” but excluded women who had previously breastfed successfully. Four further studies included women who were (at least) “considering breastfeeding” (Cases 4, 5, 12, and 13). One study included women “interested in participating” (Case 14). Another intervention included women who had already requested the intervention (Case 11). Two interventions were targeted to women who had initiated breastfeeding (Cases 2 and 10). Such variation implies different intended emphasis on persuading women to breastfeed, as opposed to affirming, enabling, and facilitating.

Many interventions were interlinked with a wider agenda to reduce health inequalities. Only three intervention cases were not specifically located/targeted to address the needs of mothers experiencing social disadvantage (Cases 2, 3, and 6); of these, two UK cases (Case 3 and 6) were delivered to mothers living in areas with rates of social deprivation that were higher than the national average.

3.4 | Heterogeneity in intervention theory and design

All the interventions had narrow intended ecological reach and were underpinned by (implicit) theories of change that anticipated that mothers would choose to breastfeed, continue for longer, or delay introduction of breastmilk substitutes *because their own individual care*

TABLE 1 Index study papers associated with included intervention cases

Case	Index papers	Goal	Delivery issues	Fidelity issues	Performance in relation to outcomes (int. vs. control)	Evaluation design
1	McInnes et al. (2000)	To improve initiation rates and continuation rates to 6 weeks for women of all parity living in a socially deprived, geographically defined population.	Yes	No	Significant increase in initiation (23% vs. 20%) after MLR analysis, no significant increase at 6 weeks (10% vs 8%).	Quasi-experimental
2	Dennis et al. (2002)	To improve continuation rates to 3 months among a geographically defined population of first time mothers who had initiated breastfeeding.	No	No	Significant increase in continuation at 3 months (81.1% vs. 66.9%).	RCT
3	Graffy et al. (2004)	To improve continuation rates at 6 weeks among women of all parity "considering breastfeeding" but without a prior successful breastfeeding experience, in population defined by GP practice registration.	Yes	No	No significant increase in continuation to 6 weeks (65% vs. 63%).	RCT
4	Chapman, Damio, Young, et al., (2004)	To improve breastfeeding initiation and continuation rates through the first 6 months among women of all parity who were "considering breastfeeding" in a geographically defined population of WIC clients.	Yes	Yes	Significant decrease in non-initiation (9% vs. 23%) discontinuation at 1 month (36% vs. 49%) and 3 months (56% vs. 71%).	RCT
5	Anderson et al. (2005)	To improve exclusive breastfeeding rates at 3 months among women of all parity who were "considering breastfeeding" among WIC clients intending to deliver in a particular hospital.	No	No	Significant decrease in non-exclusive breastfeeding over past 24 hr at 3 months (99% vs. 79%).	RCT
6	Muirhead et al. (2006)	To improve breastfeeding initiation and continuation rates among women of all parity in population defined by GP practice registration.	No	Yes	No significant increase in initiation or in continuation at 6 weeks (31% vs. 29%).	RCT
7	MacArthur et al. (2009)	To improve breastfeeding initiation rates among women of all parity in a population defined by GP practice registration.	Yes	Yes	No significant increase in initiation (69.0% vs. 68.1%).	RCT
	Jolly, Ingram, Freemantle, et al. (2012)	To improve breastfeeding continuation rates at 6 weeks and 6 months among women of all parity, in a population defined by GP practice registration.	Yes	Yes	No significant increase in continuation at 6 weeks (62.7% vs. 64.5%) or at 6 months (34.3% vs. 38.9%).	RCT
8	Gross et al. (2009)	To improve breastfeeding initiation rates and continuation rates among women of all parity, in a geographically defined population of WIC clients.	Unclear	Unclear	Significant increase in initiation (60.9% vs 47.3%).	Natural experiment
9	Yun, Liu, Mertzlufft, and Kruse (2010)	To improve breastfeeding initiation rates and continuation rates among women of all parity, in a geographically defined population of WIC clients.	Unclear	Unclear	WIC agencies using prenatal peer support had significantly higher initiation rates (51.1% vs. 48.8%) after adjusting for confounders.	Natural experiment

(Continues)

TABLE 1 (Continued)

Case	Index papers	Goal	Delivery issues	Fidelity issues	Performance in relation to outcomes (int. vs. control)	Evaluation design
10	Di Meglio, McDermott, and Klein (2010)	To improve breastfeeding continuation rates among adolescent mothers who had initiated breastfeeding who were WIC clients.	Yes	Yes	No significant difference in breastfeeding duration (median 75 days in the intervention group vs. 35 days in the control group).	RCT low power
11	Olson et al. (2010)	To improve breastfeeding initiation rates and continuation rates to 6 months among women of all parity who had themselves requested the BFPS service, in a geographically defined population of WIC clients.	No	No	Significant increase in mean duration (unadjusted increase of 2.6 weeks). Significant increase in unadjusted initiation rates: 49.3% versus 68.6%, continuation rates: 8.9% versus 17.5% breastfeeding at 3 months, and 15.3% versus 8.6% ($p < .01$) at 6 months.	Natural experiment
12	Chapman et al. (2013)	To improve exclusive breastfeeding rates at 1 and 3 months among a hospital population of overweight/obese women who were "considering breastfeeding" in a hospital-based population, hospital serving low income mothers.	Yes	Yes	No significant increase in initiation (99% in both groups). Non-significant increase in continuation (93% vs. 84%) and exclusivity (81% vs. 67%) at 2 weeks. After MLR no significant increase in continuation or exclusivity at any time point.	RCT loss to follow up. Low power. Control contamination
13	Reeder et al. (2014)	To improve breastfeeding initiation rates and continuation and exclusivity at 3 and 6 months among women of all parity who were "intending to breastfeed or considering breastfeeding" who were WIC clients. High background initiation rates –the focus on continuation and exclusivity.	Yes	No	Increased nonexclusive breastfeeding at least 3 months adjusted RR 1.22, 95% CI [1.10, 1.34], relative to a mean of 59%. Increases driven by increases in Spanish-speaking subpopulation.	RCT. Hawthorne effect indicated by external validity analysis
14	Srinivas et al. (2015)	To increase continuation and exclusive breastfeeding rates at 6 months among women who were "interested in participating" in the study in a hospital affiliated population of WIC clients. The study was designed to adjust for self-efficacy.	Yes	No	After adjusting for self-efficacy, increased continuation at 1 month (34% vs. 28%) were significant. The intervention group was more likely to achieve their breastfeeding goal (43% vs. 22%). No difference at 6 months (4% continuation in both groups).	RCT
15	Scott et al. (2017)	To improve breastfeeding initiation and continuation at 2 weeks and at 6 weeks among adolescent mothers in geographically defined population.	Yes	No	Significant increase in prevalence at 2 weeks by 0.5 percentage points (69.6% in intervention period, compared to 33.8% in comparison period). No significant increase above trend at 6 weeks.	Natural experiment

Note. MLR = multiple linear regression; RCT = randomised controlled trial; WIC = women, infants, and children.

pathways for feeding were enhanced by the addition of one-to-one BFPS support. The Case 1 intervention did intend community-level change; however, this intention was not reflected in the evaluation strategy.

An implicit belief that mothers' goals and public health goals to some extent align appeared to underlie several included interventions, as indicated by the fact that the interventions (designed to meet a public health goal of increased breastfeeding rates) were sometimes super-

imposed on philosophies of support-giving that were explicitly centred on the mothers own feeding goals. All training packages that were examined emphasised listening skills to some extent (Cases 3, 8, 9, 11, and 13–15); breastfeeding counsellors used in Case 3 were trained to use a person-centred approach.

The interventions emphasised similarity between the mother and the peer to different extents, as indicated in Table 3. Most interventions recruited peers on a locality basis, suggesting an intention to

TABLE 2 Quality assessment for realist review

Case materials and quality	Intervention theory described in detail (✓/✗)	Detailed description of intervention components	Social context described	Infant feeding context described	Health service context described	Implementation issues, take-up and received dose	Process evaluation (✓/✗) other process information (✓)	Outcomes consistent with the (inferred) theory of change
1 Study paper (McInnes et al., 2000); process evaluation (McInnes & Stone, 2001); communication with lead author (August 2017).	X	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓	See discussion
2 Study paper (Dennis et al., 2002); process evaluation (Dennis et al., 2002); concept paper (Dennis, 2003); personal correspondence with lead author (Dennis, April 2017).	✓✓	✓✓	✓	✓✓	✓	✓✓	✓✓	✓
3 Study paper (Graffy et al., 2004); sibling study (Graffy & Taylor, 2005) information about training from NCT (NCT Breastfeeding Counsellor Training, n.d., accessed 2017); background breastfeeding rates from infant feeding survey 2005 (Bolling et al., 2005).	X	✓✓	✓	✓	✓	✓✓	✓	✓
4 Study paper (Chapman, Damio, Young, et al., 2004); sibling study—secondary analysis (Chapman, Damio, & Perez-Escamilla, 2004), communication with co-author—Chapman, Damio, Chapman, & Perez-Escamilla, 2007).	X	✓✓	✓✓	✓✓	✓	✓✓	✓	✓
5 Study paper (Anderson et al., 2005); sibling study - secondary analysis (Anderson et al., 2007); communication with lead author (May 2016).	X	✓✓	✓✓	✓✓	✓	✓✓	✓	✓
6 Study paper (Muirhead et al., 2006).	X	✓✓	✓✓	✓	✓	✓✓	X	✓
7 Study papers (Jolly, Ingram, Freemantle, et al., 2012; MacArthur et al., 2009); communication first study paper lead (December 2016).	X	✓✓	✓	✓✓	✓	✓✓	✓	✓
8 Study paper (Gross et al., 2009); sibling qualitative study (Gross et al., 2015); training package (United States Department of Agriculture (USDA), n.d., accessed 2017)	X	X	✓	✓✓	✓	X	X	✓
9 Yun et al. (2010); training package (loving support and peer counselling training, accessed 2017)	X	X	✓	✓	X	X	X	?
10 Study paper (Di Meglio et al., 2010); training package (La Leche league International, n.d., accessed 2017)	X	✓✓	✓✓	✓✓	X	✓✓	X	✓
11 Study paper (Olson et al., 2010); sibling study—health outcomes evaluation (Haider, Chang, Bolton, Gold, & Olson, 2014); sibling study—analysis of participant characteristics (Bolton, Chow, Benton, & Olson, 2009); training package (loving support and peer counselling training, accessed 2017)	X	✓✓	✓✓	✓✓	✓	✓✓	✓✓	✓
12 Chapman et al. (2013); training package (La Leche league International, n.d., accessed 2017)	X	✓✓	✓✓	✓✓	✓✓	✓	✓	✓

(Continues)

TABLE 2 (Continued)

Case materials and quality	Intervention theory described in detail (✓/✓)	Detailed description of intervention components	Social context described	Infant feeding context described	Health service context described	Implementation issues, take-up and received dose	Process evaluation (✓/✓) other process information (✓)	Outcomes consistent with the (inferred) theory of change
13 Study paper (Reeder et al., 2014); external validity study (Alfindag, Reeder, & Joyce, 2015); final study report (Reeder, 2008); communication with lead author (May 2016); (loving support and peer counselling training, accessed 2017)	X	✓✓	✓✓	✓✓	✓✓	✓	✓✓	✓
14 Study paper (Srinivas et al., 2015); communication with lead author (May 2016)	X	✓✓	✓✓	✓✓	✓	✓✓	✓	✓
15 Study paper Scott et al. (2017); communication with lead author (May 2016)	✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓	✓

Note. (x) = not described; (✓✓) = detailed; (✓) = some information.

TABLE 3 Adherence to the principle of homophily

Intervention case number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Adherence to principle of homophily	McInnes et al. (2000)	Dennis (2002)	Graffy et al. (2004)	Chapman, Damio, Young, et al. (2004)	Anderson et al. (2005)	Muirhead et al. (2006)	MacArthur et al. (2009)/Jolly, Ingram, Freemantle, et al. (2012)	Gross et al. (2009)	Yun et al. (2010)	Di Meglio et al. (2010)	Olson et al. (2010)	Chapman et al. (2013)	Reeder et al. (2014)	Srinivas et al. (2015)	Scott et al. (2017)
Has breastfed	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
From target locality	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shares a key characteristic										✓					
Further within-intervention matching				✓				✓		✓		✓	✓		

match according to social background and geographical setting (Cases 1, 4, and 6–15). Six interventions attempted to individually match mothers to peers by ethnicity or language (Cases 4, 8, 10, and 12–14). Two interventions targeted to adolescents used adolescent peers (Cases 10 and 15). The Case 13 intervention targeted to recent Spanish-speaking immigrants matched peers by first language.

Interventions differed considerably according to indicators of peer professionalisation, as indicated in Table 4. At one extreme, Case 3 “breastfeeding counsellors” were trained to University Diploma level whereas at the other, Case 2 peers received only 2-hr orientation. Peers recruited for Cases 4, 5, 7–9, and 11–15 were employed, or managed, by health care professionals. Peers involved in Cases 4, 5, 7, and 12 provided support in a health care setting. The interventions were embedded into existing health systems to different degrees. A minority of intervention case settings had prior experience of BFPS (Cases 5 and 11–13).

Social Learning Theory was explicitly cited in relation to Case 15. Publications relating to Cases 1 and 14 explicitly referred to social influence as an underpinning mechanism. Published articles relating to Cases 1, 4, 5, and 8 referred to peer supporters as role models.

Different relationships with different aspects of social support were inferred from intervention design. Informational support seems to have been intended through antenatal contact in Cases 1, 3, 7, 12, and 13 and was used to address specific feeding-related beliefs in Case 12. Emotional support was indicated by emphasis on listening skills in all available training materials (Cases 3, 8, 9, 10, 11, and 13); material for eight intervention cases (Cases 1, 2, 4–6, and 10–12) made explicit mention of an intention for the peer to develop a trusting relationship. Case 12 referred to peers drawing on motivational interviewing techniques, a form of *appraisal support*. Several US cases emphasised hands-on instrumental support to establish breastfeeding (Cases 4, 5, and 12) and Case 3 peers were trained to observe feeds and help solve breastfeeding problems. Case 3, 4, 5, and 12 peers were intended to facilitate access to aids, including breast pumps, slings, and nipple shields.

Comparison across interventions indicated considerable heterogeneity in the timing, frequency, intensity, and setting for contacts, as shown in Table 5. Differences may reflect different underpinning beliefs about the importance of building relationships and continuity of care. However, discussion with authors suggests resource considerations, logistical issues, safety issues, and existing service configurations also influenced this aspect of intervention design.

3.5 | Design opportunities and weak points

Context-mechanism, context-outcome, mechanism-outcome, and context-mechanism-outcome relationships were extracted from the materials collated for each intervention case. An example extraction sheet, illustrating how extracted interactions were evidenced for Case 1, is provided in Table 6. Further supplementary material relating to CMO extractions for each intervention case is available from the authors on request.

Alongside the process of data extraction, a master list of CMO statements was developed to facilitate cross-case comparison. This master list formed the basis of propositional statements, describing mid-range theories about how one-to-one BFPS interventions might be expected to operate in different contexts towards different kinds of outcomes.

TABLE 4 Professionalisation and integration

Intervention case number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Para-professional status	McInnes et al. (2000)	Dennis (2002)	Graffy et al. (2004)	Chapman, Damio, Young, et al. (2004)	Anderson et al. (2005)	Muirhead et al. (2006)	MacArthur et al. (2009)/Jolly, Ingram, Freemantle, et al. (2012)	Gross et al. (2009)	Yun et al. (2010)	Di Meglio et al. (2010)	Olson et al. (2010)	Chapman et al. (2013)	Reeder et al. (2014)	Srinivas et al. (2015)	Scott et al. (2017)	
Training		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Less than 20-hr training																
Between 20- and 30-hr training	✓															
More than 30-hr training																
Integrated																
Employed and managed by health care system				✓	✓		✓	✓	✓	?	✓	✓	✓	✓	✓	✓
Clear referral pathways professional-peer		✓		✓				✓	?		✓	✓	✓	✓	✓	✓
Work on postnatal ward or clinic setting				✓	✓		✓	?	?			✓	✓			
Embedded																
Experience of BFPS in this health care context		?		?	✓			?	?	?	✓	✓	✓	?		
Funding beyond lifespan of the experiment	✓								✓	✓	✓	✓				✓

TABLE 5 Intended contacts

Case number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	McInnes et al. (2000)	Dennis (2002)	Graffy et al. (2004)	Chapman, Damio, Young, et al. (2004)	Anderson et al. (2005)	Muirhead et al. (2006)	MacArthur et al. (2009)/Jolly, Ingram, Freemantle, et al. (2012)	Gross et al. (2009)	Yun et al. (2010)	Di Meglio et al. (2010)	Olson et al. (2010)	Chapman et al. (2013)	Reeder et al. (2014)	Srinivas et al. (2015)	Scott et al. (2017)
Planned contacts (intended)															
Timing of planned contacts															
Antenatal contact	✓		✓	✓	✓	✓	✓	✓	?		?	✓	✓	✓	✓
More than one antenatal contact	✓						✓		?			✓	✓		
Within 72 hr of the birth		✓		✓	✓	✓	✓		?	✓	✓	✓			✓
Focus on early weeks	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	✓		✓
Planned contact after 4 months	?	✓						✓	?		✓				
Intensity of postnatal contacts															
Entirely reactive	✓		✓												
Fewer than 5 planned							✓	✓	?				✓		?
More than 5 planned			✓	✓	✓	✓			?	✓	✓	✓			?
"Negotiated proactive"		✓							?	✓	✓	✓			
Mother can ask for additional help	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	✓	✓	✓
Mode antenatal contacts															
Primarily telephone							✓		?				✓		
Planned face-to-face	✓								?						
Clinic/hospital									?						
Mother's home	✓		✓	✓	✓				?		✓	✓			✓
Mode of postnatal contacts															
Primarily telephone		✓	✓			✓	✓	✓	?	✓	✓	✓	✓	✓	✓
Primary face-to-face	✓		✓	✓	✓	✓			?			✓			✓
Suppl. face-to-face			✓			✓				✓					
Hospital before discharge			✓	✓	✓				?			✓			
Other clinic/hospital			✓	✓	✓	✓			?				✓		
Mother's home	✓		✓	✓	✓	✓	✓		?			✓			✓

TABLE 6 Example Case Description, including extracted Context-Mechanism-Outcome (CMO) relationships

Case 1	Index study: McInnes et al. (2000) Additional Case Materials: Process evaluation (McInnes & Stone, 2001). Personal communication (telephone and follow-up email) with lead author
Intervention	Goal: Improve initiation rates and continuation rates to six weeks, all parity, geographically defined population. Components: Low-dose (four contacts), antenatal-postnatal community-based, local peers. Theory: Health education and social support implied. Homophily and role modelling intended. Peers had a child aged under 5, suggests learning from recent personal experience intended. Peers called 'helpers', suggests support intended to be minimally hierarchical. Training had a motivational interviewing component and was designed to help peers 'promote breastfeeding and support breastfeeding mothers'. Intervention part of a community-wide breastfeeding promotion project. Funding was for 'action-research', action-research element did not encompass setting the intervention goals. Embeddedness: Intervention developed alongside study design. No local experience of peer support schemes. Afterwards, peers worked in hospital settings and the intervention was mainstreamed.
Context	Wider context: Scotland, UK. High levels of deprivation, very low breastfeeding rates (around 10% at six weeks), health professionals ambivalent about breastfeeding, community midwives unsure that breastfeeding was a priority, high rates of in-hospital supplementation.
Extracted CMOs [source]	Local feeding norms: Against a background of very low breastfeeding rates (C) an intervention focused on promoting and supporting breastfeeding (C) delivered to a whole population target group (C) was seen as irrelevant by many intended participants who had already made a firm decision to formula feed (M) leading to a high drop-out rate after the initial antenatal contact (O). [Trial study, process evaluation, author communication] The health care pathway: Ambivalent attitudes to breastfeeding and to the intervention among health professionals including local GPs and Health Visitors (C) and the fact that the intervention did not address high rates of formula supplementation in the hospital setting (C) led to mixed messages being received by some mothers (M) and mothers who had intended to breastfeed leaving hospital formula feeding (O) so that peers became frustrated (O) [Process evaluation, author inference, author communication] Peer accessibility: The postnatal support did not include in-hospital support (C) in a context of low breastfeeding and high rates of discontinuation (C) many mothers were not contacted in the early days after the birth (C), so that a countervailing social norm of discontinuation (M) and an assumption by health care staff that women would formula-feed (M) led to mothers switching to formula feeding before contacting the peer supporter (O). [Trial study, process evaluation, author & reviewer inference, author communication] Inside the peer-mother relationship: An antenatal visit to promote breastfeeding (C) encouraged some mothers who were undecided to consider breastfeeding (M) and/or may led mothers to report intention to breastfeed as a socially acceptable response (M) leading more mothers 'intending' to breastfeed (O) [Trial study, process evaluation, author & reviewer inference, author communication] Inside the peer-mother relationship: Breastfeeding mothers (C) frequently felt that their decisions were affirmed and valued by the peers (M), leading to improved self-esteem (O) [Process evaluation, reviewer inference]. Within intervention feedback: When participants decided to formula feed (C) this led to peers feeling despondent and demotivated (M), meanwhile peers felt valued by the breastfeeding mothers they supported (M) leading peers to direct time above and beyond the intervention protocol towards motivated mothers who were struggling (M). This experience of dissonance (M) led peers to collectively decide to adapt the intervention goals and refocus support towards meeting the needs of mothers who wanted to breastfeed, especially those who were not already determined to do so (O) [Process evaluation, author communication] Legacy feedback: The peer-empowerment and group-based community awareness raising aspects of the intervention (C) led peers to feel bonded to one another (M) re-enforcing commitment to a community activism role (M) leading to an increased community-level breastfeeding support presence (O). [Process evaluation, reviewer inference, author communication]. Legacy feedback: In a context of high levels of deprivation and limited educational attainment (C) the experience of training, purposive activity with affirmative feedback from supervisors and colleagues (C) led peers to gain skills and confidence and a sense of being valued (O), potentially improving community capacity for formal and informal support in the longer term [Process evaluation, reviewer inference, author communication]. Legacy feedback: Against a background of low rates (C) the intervention challenged assumptions that women would choose to formula feed (M) leading some health professionals to consider suggesting breastfeeding to more mothers (O) [Process evaluation, author communication]
Outcomes	No change in breastfeeding continuation rates. Unclear whether changes to community context were sustained. [Trial study, qualitative study]
Implement-ation	An informal change in intervention goals, with reduced focus on 'promoting' breastfeeding to mothers.
Review team reflection	Intervention goals were poorly aligned with the needs of the target population. A community participation approach to goal setting might have avoided this. May have done better to focus on improving attitudes and experiences and meeting mothers own feeding goals. For future evaluation, in such a context a community level theory of change, is needed to explore any links between intermediate goals (changes in attitudes and beliefs) and changes to the context and to take account of the impact of the need to address countervailing forces from within the existing health care system. Such an approach may need to be evaluated according to a methodology that anticipates a community-level effect.

In the process of iterating between the case extraction sheets, the master list, and an emerging set of propositional statements, we observed that sets of mechanisms and emerging mid-range theories could be usefully thematically grouped according to the ecological level at which the interaction took place. We also noted that these thematic categories reflected the presence of cumulative CMO relationships, whereby the outcome from C-M interactions occurring at one ecological level influences the

context for the next set of CMO interactions, thereby reducing the likelihood of intended mechanisms at lower ecological levels being triggered.

This observation was used to develop a diagram describing areas that should be considered in future design work, based on a loose temporal sequence of effects, presented as Figure 2. Mechanisms on the left-hand side of the diagram, which operate at higher ecological levels, influence the context for potential

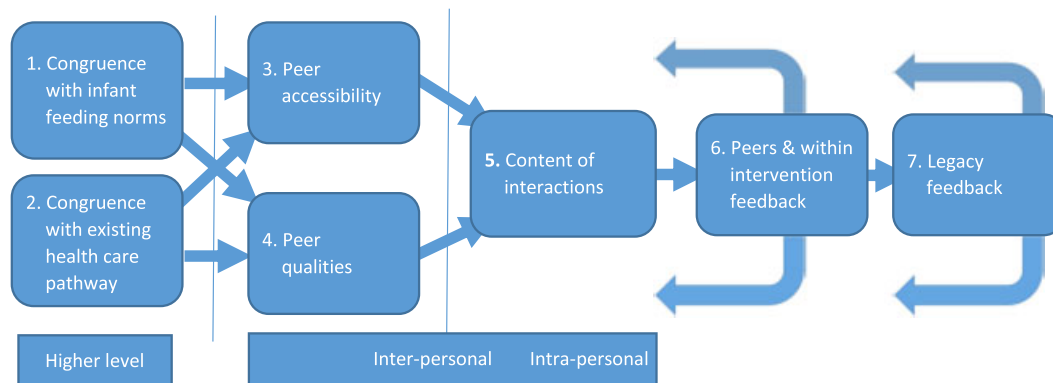


FIGURE 2 One-to-one BFPS: Cross-case analysis by ecological level, temporal sequencing, and stages of design

mechanisms in the next category, moving to the right. The categories identified were

1. Congruence with local feeding norms;
2. Congruence with the existing health care pathway;
3. Peer accessibility;
4. Peer qualities;
5. Interactions inside the peer–mother relationship;
6. Within-intervention feedback relating to the activity of peers; and
7. Legacy feedback.

The main relationships between the categories are indicated by the arrows. In the sections which follow, the evidence relating to each of the linked boxes in Figure 2 is discussed and the statements that were developed from the review relating to each box are presented.

3.6 | Category 1. Congruence with local feeding norms

In contexts where most babies are fed with formula milk beyond the early weeks (as in the UK) low-dose BFPS interventions that use antenatal intervention to educate and persuade, risk being viewed as irrelevant by mothers who simply do not want to breastfeed (Cases 1 and 6), whereas low-dose BFPS interventions to improve continuation rates may be insufficient to encourage mothers to use the help at the point when they are deciding to discontinue (Cases 3 and 7). Target populations that have multiple competing needs arising from complex personal circumstances may not view the BFPS intervention as a priority, for example, low-income adolescent mothers (Case 10) or recent immigrants (Case 12). Quasi-experimental studies relating to two USA WIC-based interventions showed improved initiation rates in a general population of mothers (Cases 8 and 9); however, there was insufficient contextual information available to draw transferrable lessons about the interaction between the intervention and the wider context in these cases.

Statement: Congruence with infant feeding norms

- The BFPS intervention will not “take” if mothers and key members of their support network perceive the gulf between the intervention goal and their own pre-existing priorities to be too broad.

3.7 | Category 2: Congruence with the existing health care pathway

Interventions already embedded within the setting and associated with a more professionalised BFPS service, tended to experience fewer implementation problems. Poor referral pathways (Cases 6 and 15) and understaffing (Case 4) led to delayed postnatal contact; in Case 6, this meant that many mothers were unable to access help during the period when they were most likely to stop breastfeeding. It was difficult to achieve BFPS referral for a transient population (Case 12). Where managers had prior experience of employing peer supporters (Cases 5, 8, and 9) sometimes to the extent that BFPS referral was already part of usual care (Case 11), health professionals already perceived peers as part of the team, with tested referral pathways in place. Case 8 and 9 BFPS interventions were funded across clinic areas in anticipation of new restrictions on provision of formula milk to WIC clients resulting from congressional legislation—this may have meant the intervention had credibility among health professionals and WIC managers, ameliorating integration issues. There is evidence from Case 9 that where peers already held some other position within the WIC agency this improved the credibility and profile of the intervention. Case 9 also found that when lactation consultants were part of the intervention team, initiation rates were higher; these individuals may have acted as champions for BFPS within the setting and provided a source of ongoing supervision and support for peers.

Where health professionals did not consider the breastfeeding support provided by peer supporters to be valuable or important, mothers tended to receive mixed-messages (Cases 1 and 6). Discontinuity resulted from misaligned hospital and WIC policies, such as routine in-hospital supplementation with formula milk (Cases 1, 12, and

13) or provision of free formula milk to the target population (Cases 12 and 13). A pre-existing baby friendly hospital setting was considered to have improved goal alignment in Case 5.

Statements: Congruence with the existing care pathway

- Ambivalent attitudes to breastfeeding among health care professionals and incongruent policies may lead to mothers receiving countervailing messages that undermine the credibility and practicability of the BFPS intervention.
- Well-specified role boundaries and referral pathways, positive prior experience of working alongside peer supporters, and the presence of a health professional champion can enhance intervention acceptance and help peers to feel comfortable in their role.

3.8 | Category 3: Peer accessibility

Two dimensions of “accessibility” emerged as important to successful delivery of BFPS. These were practical accessibility—is the help accessible at critical points?—and emotional accessibility—does the mother feel inclined to make use of the available help?

3.8.1 | Practical accessibility

Failure to achieve a peer contact soon after the birth affected several interventions intended to enable breastfeeding continuation, including all five UK studies. In some cases, proactive contact in the period soon after the birth was not a planned part of the intervention (Cases 1 and 3); in other cases, contacts were planned but were often not in practice delivered (Cases 4, 6, 7, 13, and 15). For many mothers, anticipation that BFPS might become available further down the line was not enough to them to overcome early feeding challenges. The combination of in-hospital instrumental (“hands on”) help and affirmational support in the immediate postbirth period may have led to improved initiation rates in Case 4. Cases 5 and 15 suggest that receiving an intensive (daily) dose of support via a schedule of planned contacts soon after the birth may cause some mothers to feel that their decision to breastfeed was valued and affirmed, so that they continued to breastfeed for longer than they otherwise would have done. However, there are also indications that in both these cases the motivation to continue breastfeeding was temporary and extrinsic—primarily maintained by continued contact with the peer. Improved breastfeeding rates were not maintained when support from the peer tailed away.

Statements: Peer accessibility (practical)

- In-hospital support for early feeds can help mothers who were unsure to firm up a decision to breastfeed.
- Timing of postnatal contacts should map to critical points for discontinuation as indicated by local feeding norms. For example, in low income UK settings where early discontinuation is common, failure to offer support in the hours and days after the birth will mean that many mothers do not get help when they need it and will not sustain a decision to breastfeed.

3.8.2 | Emotional accessibility

Several studies indicated that mothers face powerful social and emotional barriers to help seeking. A quarter of Case 3 mothers did not take up the reactive postnatal support offered, and many mothers discontinued breastfeeding without contacting the breastfeeding counsellor. At first glance, Case 2 appears to suggest reactive support can be effective. However, discussion with the author confirmed that the schedule of contacts delivered in the Case 2 intervention would be better described as “negotiated proactive” than “reactive”—mothers who had already initiated breastfeeding were contacted soon after the birth with a schedule of contacts then agreed between the peer and the mother. This time point for an offer of ongoing support seemed to be acceptable for mothers. Case 2 mothers almost never took up the invitation to contact the counsellor for additional support but tended to rely on the agreed schedule. As a consequence, some mothers wished the peer had contacted them more often, despite knowing they were free to contact the peer.

Statements: Peer accessibility (emotional)

- Peer support that is provided reactively will tend to be taken up by mothers who are strongly motivated to overcome breastfeeding challenges and/or are unusually confident to seek help. This form of support is less likely to be used by mothers who are more ambivalent or who are unsure about asking for help and is therefore unlikely to improve breastfeeding outcomes.
- A negotiated proactive model of peer support, where a schedule of contacts is agreed with the mother within the framework of an intended minimum dose, can help the mother to feel that the intervention is meeting her unique needs. However, the support will not be perceived as satisfactory if the negotiated dose of contacts is too low.

3.9 | Category 4: Peer qualities

The principle of homophily did not operate consistently as a mechanism for triggering mothers to use the intervention or change their behaviour. Case 2 peers did indicate that there were times when they would have felt more comfortable if they had been socially matched to mothers. Case 3 study authors suggested that socio-economic differences between the breastfeeding counsellors and the mothers they supported may have led lower income mothers to feel more reticent about help seeking; however, this supposition is difficult to disentangle from the fact that Case 3 support was offered reactively. It may simply be that reactive support is more likely to be used by middle-class mothers. Prioritising peer selection according to the principle of homophily actually undermined the Case 10 intervention. In this case peers, like the women they supported, had “multiple competing priorities, sparse social supports and responsibilities” (De Meglio et al., 2010, p. 46) and experienced the intervention as burdensome and challenging.

There is some evidence that sharing specific characteristics that directly affect feeding practices or ability to access existing support can be helpful. For example, African American peers deployed through Case 8 were aware of and able to empathise with culturally specific privacy concerns of African American mothers. Similarly, in Case 13, mothers from a transient Spanish-speaking population who tended not to contact the lactation consultant felt more comfortable with

Spanish-speaking peers, so that Spanish-speaking women were more likely to receive all the planned calls and more likely to receive additional calls. In contrast, Case 12 participants faced additional barriers to breastfeeding related to body size. This intervention did not use peers who were (or had been) overweight while breastfeeding; this may have made it difficult for them to understand or empathise with the additional challenges arising from countervailing biological mechanisms, including lactogenesis, mechanical mechanisms to do with attachment and positioning, or mechanisms relating to embarrassment and body image.

Where BFPS is poorly integrated peers sometimes lack confidence in working with less motivated clients (Cases 1 and 2). Case 10 peers did not feel socially confident to make “cold calls”, so that relationships failed to develop. The volunteer status of Case 3 peers may have presented an additional barrier to support seeking; some mothers “may have been unclear about what they could reasonably ask of a volunteer” (Graffy et al., 2004, p.5). In contrast, there is evidence that when peer support is integrated with professional support, this can lead to peers feeling valued as team members, with a recognised role, which helps them to overcome their own emotional barriers to making contact with mothers (Cases 5 and 11). The impact of training on the quality or effectiveness of peer–mother interactions is unclear. Case 2 peers, who received only 2-hr training, tended to build successful relationships with their clients. In contrast, the extensive training that Case 3 peers received did not result in a high take up of reactively offered support.

Statements: Peer qualities

- Peers do not need to be socially matched to mothers or to have specialised breastfeeding knowledge in order to be perceived as friendly and competent and to be experienced positively by the mother. Peers who are able and prepared to be proactive are more likely to be experienced positively.
- If participants have specific social, cultural, or other attributes that directly impact on feeding decisions, then using peers with experiential knowledge of the defining characteristic(s) may be helpful to bridge the gap in understanding between the mother and the peer and help the mother to overcome specific barriers.
- If the target population has complex social needs and multiple competing pressures, then selecting and retaining peers who closely resemble this population will be challenging.
- Feeling valued and integrated within the health care system can promote peer confidence, leading to improved peer retention and compliance with the intervention.

3.10 | Category 5: Inside the peer–mother relationship

Emotional support from peers was consistently valued (Cases 1, 2, 3, 6, 10, 11, and 14); mothers also valued feeling affirmed in their decision to breastfeed (Case 1, 6, and 10). Case 14 mothers tended to feel more able to meet their own breastfeeding goals because of the support. Mothers and peers often felt the contacts were instrumental in enabling specific breastfeeding challenges to be overcome (Cases 2, 3, and 11). There is some evidence from Cases 2 and 11 that a perception that

support is available if needed (rather than the peer contact) can sometimes provide a buffering effect, giving mothers the confidence to keep going and overcome challenges. The belief that additional attention is being paid by the peer supporter may also help mothers to respond more rapidly to signs that their baby is not well (Case 12).

Longer-term mother–peer relationships tended to be experienced positively (Cases 2, 11, and 14); these provided mothers with opportunities to appraise their feeding decisions on an ongoing basis (Cases 2 and 11) and sometimes resulted in the development of high levels of trust (Cases 2 and 11). However, long-term intervention was not essential to the development of supportive relationships. Short-term BFPS was experienced positively by those who made use of the help (Case 3). Good relationships developed in cases where peers were selected to be similar to the target community as well as in cases where peers and mothers had different social backgrounds.

Antenatal informational support in Cases 1, 3, and 6 did cause some mothers to change specific feeding-related intentions and beliefs. First time mothers may be particularly receptive to antenatal messages (Case 6). However, changes in understanding or intention achieved through antenatal contact did not consistently translate into changes in feeding behaviour down the line (Cases 1 and 3). In contexts where breastfeeding was unusual, intensive support from peers around the time of the birth did seem to provide additional extrinsic motivation to breastfeed (Cases 6 and 12), though once the peer was absent this appeared to be insufficient to overcome countervailing messages from the mothers’ immediate social network.

Statements: Inside the peer–mother relationship

- Mothers who experience a warm and affirming relationship with the peer supporter often feel supported to overcome challenges and meet their feeding goals.
- Peer–mother relationships can deepen over time—continuity of supporter over several months can help mothers to appraise their feeding decision on an ongoing basis. However, short-term support can also be experienced as warm and enabling.
- A buffering effect from the perception that BFPS is available when needed may help mothers overcome challenges.
- Antenatal education can change specific feeding-related beliefs.
- Presence of the peer at pivotal points may cause extrinsic motivation to initiate or continue breastfeeding; this may not translate into intrinsic motivation once the peer is absent.

3.11 | Category 6: Peers and within-intervention feedback

Peers are motivated when they feel their work is valued and feel demoralised when they feel they are not appreciated. In consequence, peers tend to be more responsive to mothers who actively seek their support and convey their appreciation (Cases 1, 3, and 14) and disengage when mothers do not respond to offers of help or decide to formula feed their babies (Case 1, 2, 13, and 14). Overtime, there is a tendency for interventions to focus resources towards mothers who are more motivated to breastfeed (Cases 1, 3, and 14). In Case 1, this tendency was formally recognised by an intervention realignment;

peers adapted the intervention goals to focus on enabling informed choice rather than persuading.

Lone working or working in conditions where there was little opportunity to meet with other peer supporters tended to exacerbate feelings of demotivation (Case 2 and 13), whereas the opportunity to meet socially or for ongoing training tended to improve peers' sense of engagement (Cases 1 and 10).

Statements: Within-intervention feedback

- Peers are motivated when they feel valued by mothers and demotivated when offers of help are rejected or breastfeeding ends. Consequently, peers tend to focus their resource towards mothers who seek support and indicate that they value it.
- Peers' enjoyment and motivation tend to be improved by opportunities to bond with one another and to learn within their roles.

3.12 | Category 7: Legacy feedback

The intervention case materials tended to focus on short-term study period effects. Only a subset of interventions continued beyond the study period (Cases 1, 5, 8, 9, 11, and 15); the impact of short-term weakly embedded interventions on the wider health care context and community setting is unknown. Some legacy benefits were gleaned from the case materials. BFPS sometimes led to peers gaining skills and confidence from training, purposive activity, and positive feedback (Cases 1–3 and 10). More broadly, community activism stimulated by peer training may lead to contextual changes at the community level (Case 1), changed perceptions of health care professionals (Case 1), and higher expectations of support for breastfeeding among mothers (Case 14). However, these kinds of changes were not formally evaluated, and it is not possible to say whether they were sustained.

Statement: Legacy feedback

- Potential positive legacy effects from BFPS include changes in mothers' expectations, the skills and confidence of peers, health professionals' attitudes and beliefs, the policy framework for existing systems of care, and attitudes to and awareness of breastfeeding at community level.

3.13 | Findings relating to the experimental context

Many interventions were temporary, implemented explicitly for experimental study in contexts with no prior experience of BFPS being delivered alongside standard care (Case 1, 3, 4, 5, 7, 10, 13, and 14). These interventions tended to be poorly embedded with unclear referral relationships and low levels of acceptance and cooperation from health care staff. Intervention-group only delivery sometimes undermined credibility among health professionals who do not see the intervention as “standard” to care, this may have led to displacement and compensating efforts directed to the control population (Cases 3 and 7). Unanticipated logistical issues associated with intended modes of delivery sometimes occurred, but it cannot be stated whether feasibility testing would have ameliorated these (Case 1, 4, 6, 7, 10, and 12–14). The effect of an intervention “bedding in” is demonstrated most clearly

by Case 15—only 4% of eligible women accessed the intervention during the first month, compared to 61% during the final month. Intervention cases delivered in settings that were already familiar with BFPS did not experience issues with intervention delivery or fidelity to the same extent (Cases 11 and 12). Experimental conditions may also result in a Hawthorne effect for BFPS (Case 13).

Statement: Experimental context

- Interventions that are designed for experimental study tend to be weakly embedded within the existing health care pathway. This can lead to BFPS having low credibility among health professionals and service managers and to implementation failure.

4 | DISCUSSION

Peer support for breastfeeding is recommended to increase breastfeeding rates (NICE, 2005, 2008; WHO, 2003). Applying a realist lens to interventions contained within the existing experimental evidence base and a process of extracting CMO interactions from our case studies, led to identification lessons for BFPS design. We anticipate the findings from this review will enable future intervention planners to adopt the staged thinking tool (Figure 2) and draw on the evidence-based statements to develop one-to-one peer support interventions that have a greater chance of being well implemented and of being accepted and valued by mothers, peers, and health professionals.

The attempt to identify intervention theories from the included cases confirms that intervention designs underpinning experimental studies have tended to be undertheorised and highlight heterogeneity among studied interventions. Descriptions of intervention theory were frequently absent from the intervention case materials. Although the theory of social support was commonly implied, different configurations of intervention components suggested differences of emphasis on informational, emotional, instrumental, or appraisal support (House, 1981). Even within the relatively narrow inclusion criteria for this review (one-to-one care pathway forms of BFPS intervention, delivered in developed country settings, to mothers of full-term babies), we found considerable heterogeneity in the type and scale of breastfeeding rate issues that were addressed, the specific intervention components that were employed, the wider delivery context, and background social norms. Recruitment strategies for peers varied in extent of compliance with the principle of homophily. There was considerable heterogeneity in the extent to which peer professionalisation and peer integration with existing services was intended. Such variation problematises conclusions drawn from traditional methods of evidence synthesis, which rely on grouped interventions being similar to one another.

Although interpersonal theories of change will clearly be fundamental to an intervention that is centred on a peer–mother relationship, the findings of this review indicate strongly that BFPS intervention design should incorporate theories (and associated intended mechanisms for change) operating at higher ecological levels. As Jagosh et al. (2012) has noted, context-mechanisms-outcome configurations are often embedded inside one another or temporally ordered so that an outcome from one interaction becomes the context

for the next interaction. BFPS interventions rely on a chain of mechanisms firing in sequence, as illustrated in Figure 2. Failure to align the intervention with upstream contextual influences, including with local feeding norms and with the existing health care pathway, frequently leads to implementation failure. This finding highlights the need for those designing and evaluating complex interventions to consider such interventions as interruptions to wider complex adaptive systems (Fletcher et al., 2016; Hawe, Shiell, & Riley, 2009) and for those responsible for intervention design to take a co-production approach to intervention development (Harris et al., 2015).

Our review confirms findings from qualitative research that background feeding norms and behaviours interact with BFPS interventions in important ways and that the strength of countervailing mechanisms among mothers who had not themselves previously considered breastfeeding and who are living in areas with very low background breastfeeding rates may be very difficult to overcome (McInnes et al., 2013). The tendency among peers to modify interventions protocols and to direct time and emotional energy towards mothers who are more motivated to breastfeed is understandable. It is worth considering whether peer supporters are not enacting a rational distribution of their resources when they do this, directing their energies in a way that they perceive will make the greatest difference. This behavioural aspect of peers should be considered alongside findings from Ingram et al. (2010) suggesting that interventions targeted to already motivated populations are more successful and raises questions about the appropriate goals for BFPS intervention in areas with high background formula feeding rates.

The review confirmed findings from Harris et al. (2015) that peer support interventions often rely on support from health professionals. BFPS interventions inserted into service contexts in which managers and maternity staff are ambivalent about breastfeeding, where formula milk supplementation rates are high and where health professionals themselves lack the knowledge and skills to enable breastfeeding are unlikely to be delivered as intended or be effective. Even where the goals of the intervention are congruent with an existing service agenda, further work is needed to embed the intervention and establish effective referral pathways. Aiken and Thomson (2012) found that integration can be improved through processes that emphasise collaboration, including improving visibility of peers in a health professional setting, joint-training, opportunities for mutual feedback between peer supporters and health professionals, shared access to systems and records, and paid coordination of peers. However, our review found that integration barriers were often context-specific. From a design perspective, it may be more fruitful to specify a stage of identifying and overcoming context-specific barriers to integration, incorporating processes that improve integration, rather specifying a one-size fits all approach.

Help needs to be timely—this does not imply a standardised approach to specifying points for intervention, but rather means ensuring that contacts anticipate “pivotal points” for changes in feeding behaviour in the target population, along the lines discussed by Hoddinott, Craig, Britten, and McInnes (2012). In a UK context, where unplanned drop-off in breastfeeding in first 2 days is common (McAndrew et al., 2012), this means proactive contact soon after the birth is required. Proactive support need not mean that the support

is untailored; a negotiated proactive approach may enable a mother to adjust a schedule of contacts to meet her needs (Dennis, 2002). However, a negotiated model needs to take account of the clear finding from this review that women of all backgrounds experience significant emotional barriers to contacting peer supporters for help. The findings from this review contradict the notion, derived from a person-centred counselling approach, that supporter “*should do nothing to impose herself on the client*” as this will undermine the mother’s experience of being in control (Seel & Seel, 1990).

The review confirmed that mothers value warm emotionally supportive relationships (Schmied, Beake, Sheehan, McCourt, & Dykes, 2011). However, it was not possible to identify any aspects of training or ways of delivering the support (e.g., face-to-face/telephone and long-term/ short-term) that were consistently associated with the kinds of relationships that mothers appreciated. It is perhaps surprising that providing socially similar peers did not consistently emerge as an important trigger for change mechanisms. It is possible that an upstream priority of ensuring interventions are accessible may have masked additional benefits arising from perceived similarity in our CMO analysis. Alternatively, it may be that the “like me” qualities of the peer are less important in care pathway one-to-one support models of BFPS support, where the peer’s role may be perceived as being close to that of an auxiliary health care worker. A further surprise, trained breastfeeding expertise did not consistently emerge as an important mechanism for effective intervention. Again, this may be because the impact of upstream considerations have masked the effect of trained expertise. It may be that that social support is a more important trigger for change. Or, it may be that the peer’s own level of expertise is less important than her ability to facilitate access to expertise from elsewhere within the referral pathway.

This review was bounded by including only one-to-one support interventions and only interventions that have been subject to experimental study; it is important to note that these review boundaries may limit applicability of lessons. Harris et al. (2015) make a distinction between peer support interventions underpinned by a top-down public-health epistemological stance and those underpinned by community-based participatory approaches to agenda setting. The public health agenda driven BFPS interventions that predominate the experimental review evidence, represent a subset of existing BFPS intervention types (Trickey, 2013) and reflect a bias towards authoritarian forms of intervention in the experimental literature relating to peer support more generally (O’Mara-Eves et al., 2013). In practice, in the UK and elsewhere, BFPS is often delivered as a group-based intervention (Dykes, 2005).

The quality of the lessons drawn from this review is dependent on the quality of the included cases, which varied. Only four cases included a process evaluation, and we were not successful in contacting all the study authors to elicit further information. Where process studies did exist, a description of intended mechanisms for change was often lacking, making it difficult to ascertain whether intended mechanisms had been triggered. Description of the pre-intervention context was weak for several cases. Two cases lacked a detailed description of the components of the intervention. We recommended that a full description of the intervention context, theory of

change, and intended mechanisms is a part of reporting for all future BFPS experimental studies.

The thinking tool and statements presented provide an evidence-based guide to one-to-one BFPS intervention development. They do not supersede a need for future evaluation. The review highlights ways in which experimental conditions may make it more likely that mechanisms associated with implementation failure will be triggered, problematising learning from experimental studies. There is a need for evaluators to account for contextual influences (Bonell, Jamal, Melendez-Torress, & Cummin, 2015), to integrate realist principles into evaluation designs (Fletcher et al., 2016) and to integrate process evaluations with randomised controlled trials (Moore et al., 2015). These enhancements would improve our ability to discern “*What works, for whom, in what circumstances and in what respects, and how?*” (Pawson & Tilley, 1997).

There is a need to consider BFPS interventions in terms of their potential to contribute to a broader public health policy objective of bringing about sustained change in infant feeding norms in developed country settings. The evidence presented here relates to BFPS interventions that—are primarily focused on changing the behaviour of individual mothers. A consensus is now building around an understanding that interventions operating at the individual level alone are unlikely to achieve sustained change in breastfeeding rates and that wider social, structural, and service constraints should now be the focus of public health policy.

Behaviour change theories have become more complex, enabling those designing interventions to consider influences at different ecological levels. For example, *The Behaviour Change Wheel* (Michie, van Stralen, & West, 2011) highlights three essential components to enact change at an individual level: capability (psychological and physical), motivation (autonomic and reflective), and opportunities (social and physical). The next layer of the wheel details nine intervention functions (e.g., training, environmental restructure, modelling, and education) aimed at addressing deficits in one or more of the essential components. The final circle of the wheel describes seven categories of policy that could enable those interventions to occur (e.g., service provision, fiscal measures, guidelines, and communication/marketing). Although there is a recognised need to understand the interactions between these levels (Dyson et al., 2006; Labbok, Smith, & Taylor, 2008; Rollins et al., 2016; Trickey, 2016), at present, we lack a unifying theory that would allow us to translating an ecological understanding of influences into a prescription regarding the sequence in which influences should be addressed. The place of intermediate outcomes—for example, changes in wider service context, changes in attitudes, changes in beliefs, and changes in intentions—on a pathway to change community or society-level norms is undertheorised.

The absence of overarching theories of change for infant feeding behaviour at community level means that it is difficult for intervention planners to target BFPS interventions to maximum benefit. Should BFPS interventions focus on encouraging more women to initiate breastfeeding or on enabling more women to continue? Should the emphasis be on breastfeeding rates or on positive experiences and changing attitudes? In the medium-term, commissioners will need answers to these broader questions. In the meantime, we recommend that intervention planners draw on our stages of design model for BFPS

in conjunction with taking a context-specific participatory approach to agenda setting, so that local level theories of change can be developed and appropriately evaluated.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

HT designed and led the research, managed the process of data collection and analysis, integrated intellectual content and produced the initial drafting. GT, AG, JS, and SP contributed substantially to data collection, to data interpretation and to drafting. MM designed the literature search strategy, and contributed to data interpretation and drafting. SM contributed to data interpretation and drafting. All authors contributed intellectual content and approved the final article.

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