



# Interventions promoting exclusive breastfeeding up to six months after birth: A systematic review and meta-analysis of randomized controlled trials

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## ARTICLE INFO

### Keywords:

Exclusive breastfeeding  
Lactation  
Prenatal  
Postnatal  
Intervention  
Systematic review  
Meta-analysis

## ABSTRACT

**Background:** The World Health Organization (WHO) recommends that mothers practice exclusive breastfeeding (EBF) of their infants for 6 months. Various breastfeeding support interventions have been developed to encourage mothers to maintain breastfeeding practices. Research aim: This study aims to review how effectively breastfeeding support interventions enable mothers to practice EBF for 6 months and to suggest the best intervention strategies.

**Methods:** Six databases were searched, including MEDLINE, EMBASE, Cochrane, CINAHL, PsycINFO, and KoreaMed. The authors independently extracted data from journals written in English or Korean and published between January 2000 and August 2017. Randomized controlled trials (RCTs) reporting EBF until 6 months were screened.

**Results:** A total of 27 RCTs were reviewed, and 36,051 mothers were included. The effectiveness of breastfeeding support interventions to promote EBF for 6 months was significant (odds ratio [OR] = 2.77; 95% confidence interval [CI]: 1.81–3.76). A further subgroup analysis of intervention effects shows that a baby friendly hospital initiative (BFHI) intervention (OR = 5.21; 95% CI: 2.15–12.61), a combined intervention (OR = 3.56; 95% CI: 1.74–7.26), a professional provider led intervention (OR = 2.76; 95% CI: 1.76–4.33), having a protocol available for the provider training program (OR = 2.87; 95% CI: 1.89–4.37) and implementation during both the prenatal and postnatal periods (OR = 3.32; 95% CI: 1.83–6.03) increased the rate of EBF for 6 months.

**Conclusion:** We suggest considering a multicomponent intervention as the primary strategy and implementing BFHI interventions within hospitals. Evidence indicates that intervention effectiveness increases when a protocol is available for provider training, when interventions are conducted from the pre- to postnatal period, when the hospital and community are connected, and when healthcare professionals are involved.

## What is already known about this topic?

- Previously, there was no evidence regarding the efficacy of breastfeeding promotion interventions to promote 6 months of EBF and no reviews regarding the intervention strategies used to enhance compliance.

## What this paper adds

- Through systematic review and meta-analysis of RCTs, mothers who received breastfeeding promotion interventions were 2.77 times more likely to continue EBF 6 months after birth. Five strategies were identified to improve the effectiveness of interventions: multicomponent intervention, professional involvement, having a precise protocol for provider training, interventions persisting from the

prenatal to postnatal period and interventions incorporating both hospital and community settings.

## 1. Background

Breastmilk is an optimal nutritional source for the growth and development of infants. Compared with breastfeeding in general, exclusive breastfeeding (EBF) has been associated with better health outcomes. EBF offers numerous benefits: reduced rates of infant morbidity resulting from allergic and gastrointestinal disease, reduced pneumonia rates, greater prevention of non-communicable disease and a long-term reduction in obesity rates (Kramer and Kakuma, 2002; Kramer and Kakuma, 2004; Lamberti et al., 2013; Moran et al., 2015). Additionally, further social-emotional development can be achieved with EBF. The greater frequency of mother-baby interactions fosters

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psycho-social development, which studies have linked to improved overall psycho-social health leading to high social competence (Belfort et al., 2016). Due to the remarkable positive impacts of EBF, the World Health Organization (WHO) recommends that mothers practice EBF for the first 6 months of their infants' lives (WHO, 2002). Myriad studies report that the beneficial effects of breastfeeding increase with greater duration and exclusivity.

Although the WHO strongly recommends EBF for 6 months, some mothers choose early EBF cessation. The primary reason for discontinuing breastfeeding is a lack of skilled counselling and support. In addition, lack of motivation and realistic and personal life issues lead mothers to stop breastfeeding (Lindau et al., 2015). Currently, strategies to prolong breastfeeding are implemented either by trained health care personnel or laypeople and through educational or facility-based programs (Haroon et al., 2013a,b). Health care professionals have attempted various interventions to encourage mothers to continue breastfeeding. One of the primary strategies reported in the literature is the use of various forms of interactive counselling by peers or health care personnel. These counselling sessions are conducted using primarily one-on-one strategies via home visits or telephone calls (Chapman et al., 2010). All types of counselling are classified as distinct interventions with different effects on the primary outcome: the promotion of breastfeeding.

Within a hospital setting, one frequently used intervention is the WHO/United Nations Children's Fund (UNICEF) Baby Friendly Hospital Initiative (BFHI) program (Brodrick et al., 2013). In a large, randomized controlled trial (RCT), women in the intervention group who received support from providers and took a 2-day, intensive BFHI training course had significantly higher rates of EBF at 6 months (Yotebieng et al., 2015). A previous study identified the positive effects of nurse-led counselling after 6 months (12 sessions) of telephone counselling. Another recent RCT found that mothers in the intervention group, who participated in counselling groups led by peer counsellors, had EBF rates four times higher than women in the control group (Ochola et al., 2013). The effect of education was identified in a study that found higher rates of EBF among women who received training in lactation skills and knowledge sharing from a registered nurse (Kupratakul et al., 2010).

To our knowledge, this is the first study to review how effectively EBF promotion interventions result in EBF for 6 months. The previous reviews include the effectiveness of community-based peer or professional support interventions (de Oliveira et al., 2001; Chung et al., 2008), educational programs (Guise et al., 2003), and supportive interventions by professionals at hospitals (Haroon et al., 2013a,b; Hannula et al., 2008). Most previous reviews were limited in that they investigated the effects of breastfeeding promotion interventions in general, not specifically on EBF. Despite the proven effectiveness of the interventions, there was no evidence as to how effectively interventions maintained breastfeeding practices, even for as little as six months. These studies sought to measure the effects of interventions on the EBF duration. Previous studies were limited to a review of the effect of interventions on the discontinuation of EBF at any time after birth (Sudfeld et al., 2012). Additionally, Haroon et al. (2013a,b) reviewed 34 trials and found a significant increase in EBF rates as a result of breastfeeding promotion interventions (43% at day 1, 30% at < 1 month, and 90% at 1–5 months).

The current research lacks information regarding the optimal type and setting for interventions to result in higher rates of EBF at 6 months. To overcome the limitations of previous studies regarding EBF promoting interventions, this study aims to 1) systematically review the developed EBF interventions, 2) statistically evaluate the effectiveness of interventions, and 3) use the evidence to suggest best intervention to promote EBF for up to 6 months.

## 2. Methods

### 2.1. Search strategy

This study was conducted in accordance with the recommended guidelines of the Preferred Reporting Items for Systematic Review and Meta-Analysis (Moher et al., 2015). Two authors conducted the literature searches. Keywords used in the searches include: breastfeeding; lactation; psychological; psycho-social; counselling; education; support/supportive; peer support; mutual support; and self-help. The full search strategies used for individual data are provided in Table S1. Five databases were searched: MEDLINE; EMBASE; Cochrane Library; CINAHL and PsycINFO. Included were articles published between Jan 2000 to April 2016 in peer-reviewed journals. The primary search was conducted on April 9–10, 2016; and the final search was performed on August 31, 2017; to assure the inclusion of the most current findings. In addition to database searches; a manual search was performed by looking up studies referenced in key articles.

### 2.2. Inclusion and exclusion criteria

The search was limited to research articles published in peer-reviewed journals. Studies were eligible if they met the following criteria:

1. RCTs of both cluster randomized and quasi-randomized trials.
2. Published in English or Korean.
3. Intervention studies that included strategies to improve breastfeeding prevalence.
4. Reported EBF rates at 6 months for both experimental and control groups or reported outcomes as odds ratios (ORs).

For studies that included more than one breastfeeding intervention, data were combined if possible (when interventions had high similarity regarding program contents, aim, participants, and duration). When it was not possible to combine the data, then the data that best fit interventions in another study were selected. We excluded studies reporting rates of EBF earlier than 6 months. Non-RCTs (quasi-experimental design), abstracts, conference proceedings, unpublished gray literature, and review studies were also excluded.

### 2.3. Study selection

Four reviewers were paired and selected eligible studies independently. One pair of two reviewers (Kim and Lee) independently screened the titles and abstracts of studies to obtain relevant citations with a high potential for inclusion. The full texts of potentially relevant articles were evaluated using predefined inclusion criteria. Any disagreements between reviewers were resolved through discussions involving the third parties in the other pair (Kim and Ahn). We screened 6428 records that were identified through database searches. After removing duplicates, the search strategy resulted in 3631 distinct citations, of which 3537 (97.4%) were excluded during the initial screening phase (see Fig. 1). For the remaining 94 citations, full-text papers were obtained and independently assessed according to the eligibility criteria. Twenty-seven studies met the inclusion criteria. The primary reasons for the exclusion of papers were the use of non-RCT designs, primary end-points of less than 6 months, and no available statistical data for quantitative synthesis or a lack of information for qualitative synthesis.

### 2.4. Data extraction

The information from included articles was independently extracted by reviewers, and each study was reviewed twice by paired reviewers. To determine outcomes from individual studies, we extracted the rates of EBF for the intervention and control groups or the ORs with a 95%

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