

Interventions to Support Breastfeeding

Updated Evidence Report and Systematic Review for the US Preventive Services Task Force

Carrie D. Patnode, PhD, MPH; Caitlyn A. Senger, MPH; Erin L. Coppola, MPH; Megan O. Iacocca, MS

IMPORTANCE Interventions to support breastfeeding may help individuals and families initiate breastfeeding or breastfeed exclusively or for a prolonged period of time.

OBJECTIVE To systematically review the evidence on the benefits and harms of breastfeeding interventions to support the US Preventive Services Task Force in updating its 2016 recommendation.

DATA SOURCES Studies included in the previous review were reevaluated for inclusion and updated searches in MEDLINE, CINAHL, Cochrane Central Register of Controlled Trials, and PsycINFO through June 3, 2024. Surveillance for new evidence in targeted publications through January 24, 2025.

STUDY SELECTION Randomized clinical trials that evaluated a primary care-relevant intervention designed to support breastfeeding. Of 290 full-text articles reviewed, 90 met inclusion criteria.

DATA EXTRACTION AND SYNTHESIS Independent critical appraisal of all provisionally included studies. Data were independently abstracted by one reviewer and confirmed by another.

MAIN OUTCOMES AND MEASURES Child and maternal health outcomes, prevalence, and duration of any and exclusive breastfeeding, and harms related to interventions.


RESULTS Ninety trials (N = 49 597) reported in 125 publications were included. The evidence represented individuals from diverse backgrounds and interventions that varied in timing, delivery, and duration. There was limited and mixed evidence on the effectiveness of breastfeeding support interventions on infant health outcomes (10 trials [n = 6592]) and maternal symptoms of anxiety, depression, and well-being (9 trials [n = 2334]). Pooled analyses indicated beneficial associations between breastfeeding support interventions and any or exclusive breastfeeding for up to and at 6 months (any breastfeeding: risk ratio, 1.13 [95% CI, 1.05-1.22]; 37 trials [n = 13 579] and exclusive breastfeeding: risk ratio, 1.46 [95% CI, 1.20-1.78]; 37 trials [n = 14 398]). There was no relationship between interventions and breastfeeding initiation or breastfeeding at 12 months.

CONCLUSIONS AND RELEVANCE The updated evidence confirms that breastfeeding support interventions can increase the prevalence of any or exclusive breastfeeding up to and at 6 months. Future efforts should focus on how to best provide this support consistently for all individuals making feeding decisions for their infants.

JAMA. doi:10.1001/jama.2024.27267
Published online April 8, 2025.

 Editorial

 Related article and JAMA Patient Page

 Supplemental content

 CME at jamacmelookup.com

Author Affiliations: Kaiser Permanente Evidence-based Practice Center, Center for Health Research, Kaiser Permanente, Portland, Oregon (Patnode, Senger, Coppola, Iacocca); American Institutes for Research, Methods Synthesis and Integration Center, Arlington, Virginia (Iacocca).

Corresponding Author: Carrie D. Patnode, PhD, MPH, Kaiser Permanente Evidence-based Practice Center, The Center for Health Research, Kaiser Permanente Northwest, 3800 N Interstate Ave, Portland, OR 97227 (Carrie.D.Patnode@kpchr.org).

Multiple US and international organizations recommend that infants be exclusively fed breast milk for the first 6 months of life, followed by continued breastfeeding for up to 2 years as mutually desired by mother and infant while complementary foods are introduced.¹⁻⁷ In the United States, there is a sharp decline in breastfeeding as infants age, with breastfeeding the most prevalent from initiation to shortly after birth and steadily dropping off throughout the first year of the infant's life.⁸ Additionally, data continuously show a lower prevalence of breastfeeding among certain groups of individuals, including Black women and those with lower education and income.⁸⁻¹¹ While most individuals express a desire to breastfeed their infants,¹² numerous barriers may hinder their ability to do so exclusively or for an extended time. Interventions to support breastfeeding may address these barriers by providing psychological and social support (eg, encouragement, reassurance, discussing questions and problems) and direct support during breastfeeding observations (eg, helping with the positioning of the infant, observing latching), addressing misconceptions around the benefits of breastfeeding, and providing support during transitional periods (eg, return to work, daycare attendance).

It is important to continue to understand to what extent interventions designed to support individuals and families may help increase the prevalence and duration of breastfeeding and affect health outcomes and any potential harms that might be associated with these interventions. The purpose of this review was to update the US Preventive Services Task Force (USPSTF) review^{13,14} on the benefits and harms of behavioral counseling interventions to support breastfeeding among pregnant women and persons who feed their infants. It was conducted to help the USPSTF update its 2016 B recommendation¹⁵ that clinicians provide interventions during pregnancy and after birth to support breastfeeding.

Methods

Scope of Review

This review addressed 3 key questions (KQs) (Figure 1). Within this review, "breastfeeding" referred to both feeding at the breast and feeding expressed breast milk (including shared, donated, and purchased human breast milk). A full research plan was published prior to conducting the review.¹⁷ Methodological details including study selection, a list of excluded studies, additional data analysis methods, detailed study-level results for all outcomes, and contextual observational data are available in the full evidence report.¹⁸

Data Sources and Searches

To identify studies published since the previous review,¹³ literature searches were conducted in MEDLINE, PsycINFO, CENTRAL, and CINAHL for English-language articles published from 2016 through June 3, 2024 (eMethods in the Supplement). Additional studies were sought by reviewing reference lists of other systematic reviews and included studies. Ongoing surveillance using targeted searches of journals with a high impact factor was conducted to identify newly published studies that might affect the findings of the review. The last surveillance on January 24, 2025, identified no new studies.

Study Selection

Two reviewers independently evaluated citations and full-text articles from the literature searches against prespecified inclusion cri-

teria (eTable 1 in the Supplement). Disagreements were resolved by discussion and consensus. The review was limited to fair- and good-quality randomized clinical trials (RCTs, including cluster RCTs) that evaluated the effectiveness of breastfeeding support interventions that were initiated in, feasible for, or referable from primary care settings. Studies could be conducted during the prenatal, peripartum (ie, at or around the time of delivery), or postpartum period or any combination of these periods. Studies of interventions offering support that was supplementary to the standard care offered in that setting and included interventions provided by professionals, laypersons, or through digital modes of delivery were eligible for inclusion. Interventions could be delivered as stand-alone breastfeeding support interventions (ie, where the focus was on breastfeeding only) or as part of a wider maternal or infant health intervention if the intervention included a component focused on supporting breastfeeding (eg, maternal weight gain prevention).

Unlike the previous review,¹³ health system-level interventions and policies, such as hospital rooming-in policies or implementation of the Baby Friendly Hospital Initiative that may not be applicable to or within the purview of primary care clinicians to implement or recommend, were excluded. Interventions had to have been conducted in countries with "very high" human development according to the United Nations¹⁹ and to report at least 1 breastfeeding outcome (eg, initiation, duration, intensity, or exclusivity), health outcome (eg, maternal mental health symptoms, infant or child gastrointestinal symptoms), or adverse event (eg, maternal anxiety related to infant feeding, newborn dehydration).

Data Extraction and Quality Assessment

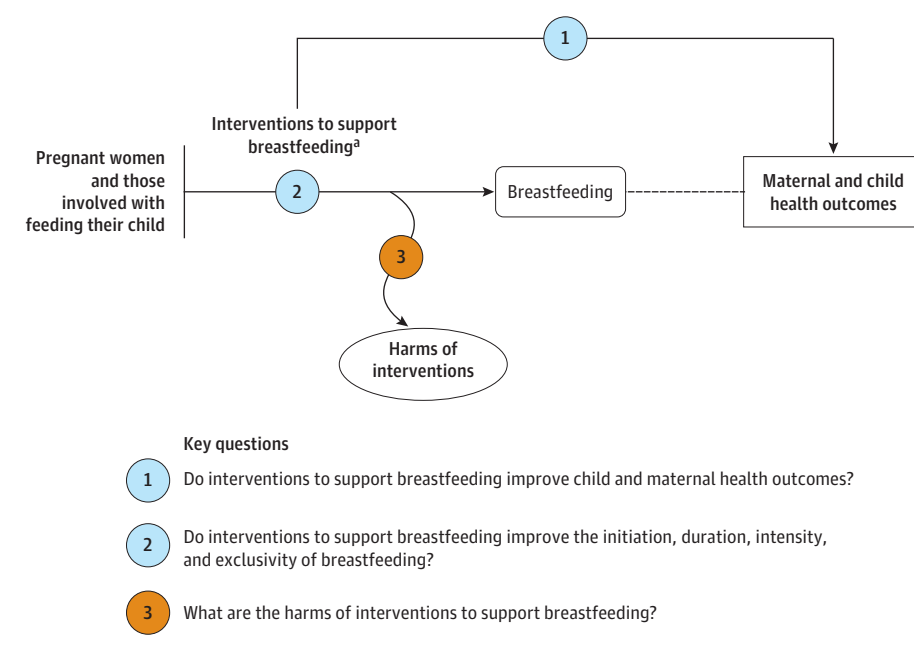
Two reviewers independently assessed the methodological quality of each study as good, fair, or poor using predefined criteria (eTable 2 in the Supplement). Discrepancies were resolved through consensus. Poor-quality studies with critical methodological limitations were excluded and typically had several major risks of bias, including very high or differential attrition between groups (generally >40% overall or >20% difference between groups), substantial lack of baseline comparability between groups without adjustment for those variables, or other issues judged to considerably bias the results (eg, possible selective reporting, inappropriate exclusion of participants from analyses).

One reviewer abstracted data about each study's design, population, interventions, and outcomes; a second reviewer checked data abstraction for accuracy.

Data Synthesis and Analysis

Data were synthesized separately for each KQ. The data on health outcomes (KQ1) and harms (KQ3) did not allow for quantitative pooling due to the limited number of contributing studies, so those data were summarized in tables and narratively. For breastfeeding outcomes (KQ2), random-effects meta-analyses were conducted using the restricted maximum likelihood estimate with the Knapp-Hartung adjustment²⁰ to calculate a pooled risk ratio (RR) and 95% CI for the prevalence of breastfeeding initiation and any and exclusive breastfeeding at various time points. The prevalence of breastfeeding was grouped into the following points: breastfeeding initiation (ie, from birth to 1 week postpartum), less than 3 months, 3 months to less than 6 months, 6 months, and 12 months. The results by exact reported time points are presented in tabular format in the full report.¹⁸ When provided in the original publication, we used author-reported

Figure 1. Analytic Framework: Interventions to Support Breastfeeding



Evidence reviews for the US Preventive Services Task Force (USPSTF) use an analytic framework to visually display the key questions (KQs) that the review will address to allow the USPSTF to evaluate the effectiveness and safety of a preventive service. The questions are depicted by linkages that relate interventions and outcomes. A dashed line indicates a health outcome that immediately follows an intermediate outcome. Refer to the USPSTF Procedure Manual for interpretation of the analytic framework.¹⁶ For all KQs, *breastfeeding* refers to feeding at the breast or feeding expressed breast milk. *Breast milk* refers to human milk. When adequately delineated in source studies, precise language (eg, feeding at the breast or feeding expressed breast milk) will be used when describing the evidence.

RRs, favoring adjusted results over unadjusted. If study-reported RRs were unavailable, we calculated crude RRs based on the number of people meeting the event criterion in each treatment group and the total number of participants randomized to each group. In these cases, the RR reflects the risk of breastfeeding, where values greater than 1.0 indicate greater breastfeeding among individuals in the intervention group compared with the control group.

The presence of statistical heterogeneity among the studies was assessed using standard χ^2 tests, and the magnitude of heterogeneity was estimated using the I^2 statistic. Meta-regression and stratified analyses were conducted to explore whether there were population or intervention characteristics associated with larger effect sizes for breastfeeding outcomes. The distribution of trial results was examined with funnel plots, and the Peters test was run to assess whether there was evidence of small-study effects.²¹ Stata version 16.1 (StataCorp) was used for all analyses. All significance testing was 2-sided, and results were considered statistically significant if $P < .05$.

The strength of evidence was rated for each KQ using the approach described in the Methods Guide for Effectiveness and Comparative Effectiveness Reviews,²² based on the number, quality, and size of studies as well as the consistency (ie, similarity of effect direction and size) and precision (ie, degree of certainty around an estimate) of the results between studies.

Results

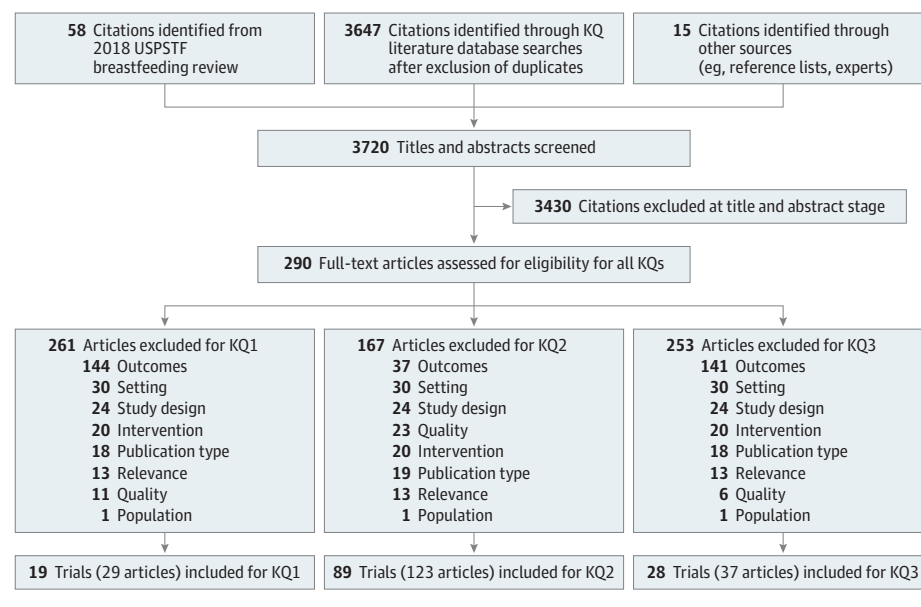
Two reviewers evaluated 3720 citations and 290 full-text articles against inclusion criteria, and 90 RCTs²³⁻¹¹¹ (reported in 125 articles²³⁻¹⁴⁶) were included (Figure 2). A complete list of the included studies, including each ancillary publication, can be found in the full evidence report.¹⁸ Details of each included study, including its quality rating, can be found in eTable 3 in the Supplement.

Just more than one-third of studies took place in the United States (33); the remaining studies took place in settings in Europe (23 studies), Asia (17 studies), Australia or New Zealand (10 studies), or Canada (7 studies). Sample sizes for the included trials ranged from 39 to 9675 participants, and the median sample size was 253. Most studies recruited women during pregnancy (57 studies) or shortly after delivery within the birthing facility (29 studies). Almost one-half the studies (40) required that women be intending to breastfeed to be eligible for study inclusion; in the remainder of studies that reported it, most women reported an intention to breastfeed at the beginning of the trials.

Trials included a wide range of populations in terms of demographic and social characteristics, and few studies comprehensively reported this data. Of the 33 studies taking place in the US, 2 were limited to Black women,^{45,73} 4 were limited to Hispanic or Latina women,^{31,56,74,77}; in the remaining studies, participants were predominantly Black and/or Hispanic and Latina women.^{27,30,32,33,35,40,43,48,57,60,61,64,72,75,84,93,107} Three studies limited enrollment to adolescents or women younger than 20 years^{43,92,107}; in the remaining trials the mean age across all participants was 28 years.

Of the 90 included trials, most (75) provided interventions focused specifically on breastfeeding education and support, while 15 focused on broader maternal and infant well-being, including a breastfeeding education and/or support component. A summary of the interventions and detailed intervention characteristics for each trial can be found in eTable 4 in the Supplement and the full report.¹⁸ Most of the breastfeeding support interventions provided formal education and/or support given by a professional, such as nurses, midwives, physicians, and/or lactation care providers.^{23,24,26,28-30,32-39,44,46,49,51-54,58,60,63,64,66-69,71,72,75,76,78-84,86-88,90,91,94-97,101-103,105,106,109-111} Eight trials explicitly stated that the lactation care providers involved in the intervention were International Board Certified Lactation Consultants or held some other lactation support

Figure 2. Literature Search Flow Diagram: Interventions to Support Breastfeeding



Reasons for exclusion: Outcomes: Study did not report relevant outcomes. Setting: Study was not conducted in a country with a "very high" development score, not relevant to US practice, or was not conducted in a setting generalizable to primary care (eg, workplace, inpatient hospital units, nursing homes). Study design: Study was not a randomized clinical trial. Intervention: Study did not include a behavioral counseling intervention designed to support breastfeeding and/or the consumption of breast milk. Publication type: Publication was not a peer-reviewed article (eg, editorial, conference proceeding) or was not available in the English language. Relevance: Study aim not relevant. Quality: Study was rated as poor quality. Population: Study did not include person(s) involved with or making decisions about feeding their child. KQ indicates key question.

certification.^{32,37,38,83,88,94,105} In 14 trials, breastfeeding support was provided by trained peers.^{27,31,40-43,47,50,55,62,74,85,93,107} In these cases, peer counselors were recruited specifically for the study; they were chosen to represent the sample population (eg, adolescents, Special Supplemental Nutrition Program for Women, Infant, and Children recipients) and had previous breastfeeding experience.

The timing, duration, and number of sessions of the interventions varied widely. In one-half of the study groups, the intervention occurred in a single period, either during the prenatal period, during the hospital stay, or during the postpartum period, while interventions spanned across or were delivered in more than 1 time period in the remaining one-half of studies. The total duration of interventions also varied widely and ranged from 1 day (1 session) to more than 1 year of ongoing support, and most interventions had 6 or fewer sessions (median, 4 [range, 1-20]).

Most of the interventions included an in-person component, with many including additional telephone, electronic, or printed components, and the remaining one-fourth of studies were delivered fully remotely (eg, via interactive smartphone app, online modules, telephone calls only). Intervention content focused on general breastfeeding education, including the maternal and infant benefits of breastfeeding and the importance of exclusive breastfeeding; advice on proper latching and other techniques to reduce breastfeeding problems; and messages designed to increase breastfeeding self-efficacy. Most interventions also provided emotional and instrumental support, which often included hands-on support to assist with proper infant positioning.

Almost all of the studies included usual care control groups, although what constituted usual care was not fully described or was highly variable given the various settings, countries, and time frames in which the interventions took place. In all cases, families in both the intervention and the control groups received usual care. The intervention components were either provided in addition to usual care services or replaced specific components of care (eg, more intensive lactation support than routinely provided).

Benefits on Health Outcomes

Key Question 1. Do interventions to support breastfeeding improve child and maternal health outcomes?

Nineteen of the 90 included trials reported a health outcome ($n = 11415$).^{27,30,33,35,40,41,51,53,57,59,60,65,70,77,86,91,96,97,101} Ten trials ($n = 6592$) reported on infant health outcomes, which included gastrointestinal outcomes (2 trials),^{27,33} otitis media (1 trial),³³ the number of health care visits for respiratory tract illnesses (1 trial),³³ and rates of infant health care utilization (7 trials).^{35,40,53,60,70,86,91} childhood illness (1 trial),⁹¹ or minor infant health outcomes (1 trial).⁹⁶ Infant health outcomes were reported from the time of birth for up to 1 year in some studies. In all cases, more favorable effects were seen on these outcomes among infants born to intervention vs control group parents. However, very few reported these differences to be statistically significantly different between groups. In cases in which differences were seen in infant health outcomes, there were no apparent differences in rates of any or exclusive breastfeeding that seemed to be driving these effects. Furthermore, in some cases, the interventions included postpartum in-home nursing support, which could help protect against poor infant health outcomes, independent of their effect on breastfeeding.

Nine trials ($n = 2334$) reported maternal symptoms of anxiety, depression, or well-being at up to 6 months postpartum. Most of the studies reported better symptom scores among intervention mothers vs control mothers; however, very few of the differences between groups were statistically different.^{30,41,53,57,65,77,97,101,118}

Narrative, detailed results for each study noted above are described in the full report¹⁸ and in eTables 5 and 6 in the Supplement.

Benefits on Breastfeeding Outcomes

Key Question 2. Do interventions to support breastfeeding improve the initiation, duration, intensity, and exclusivity of breastfeeding?

All but 1¹⁰¹ of the 90 included trials ($N = 49597$) reported the effects of an intervention on at least 1 measure of breastfeeding. In meta-analyses, there was a statistically significant association

Table 1. Pooled Results of Any and Exclusive Breastfeeding, for Individual-Level Breastfeeding Support and Education Interventions (KQ2)

Follow-up time point, mo	No. of studies	No.	RR (95% CI)	<i>I</i> ² , %
Any breastfeeding				
Initiation ^a	37	15 006	1.01 (1.00-1.02)	13.2
<3	47	15 663	1.06 (1.03-1.08)	55.1
3 to <6	40	17 580	1.09 (1.04-1.12)	42.6
6	37	13 579	1.13 (1.05-1.22)	73.4
12	8	4607	1.04 (0.91-1.18)	0.0
Exclusive breastfeeding				
Initiation ^a	27	10 622	1.16 (1.05-1.29)	75.6
<3	51	17 431	1.21 (1.14-1.28)	36.6
3 to <6	40	11 032	1.31 (1.17-1.46)	66.6
6	37	14 398	1.46 (1.20-1.78)	76.8
12	0	NA	NA	NA

Abbreviations: KQ, key question; NA, not applicable; RR, risk ratio.

^a From birth to 1 week postpartum.

between participating in a breastfeeding support intervention and the prevalence of any and exclusive breastfeeding at less than 3 months, 3 months to less than 6 months, and 6 months (Table 1). The forest plots for all pooled analyses can be found in eFigures 1 through 9 in the Supplement. For example, at 6 months, the likelihood of any breastfeeding and exclusive breastfeeding was associated with a 13% higher prevalence (RR, 1.13 [95% CI, 1.05-1.22]; *I*² = 73.4%; 37 studies [n = 13 579]) and 46% higher prevalence (RR, 1.46 [95% CI, 1.20-1.78]; *I*² = 76.8; 37 studies [n = 14 398]), respectively, among infants born to mothers in the intervention compared with control groups. The median differences in absolute prevalence of breastfeeding between groups ranged from 1 to 7 percentage points at various time points for any and exclusive breastfeeding, with slightly larger effects for exclusive vs any breastfeeding. No effect was seen on the prevalence of breastfeeding initiation, but the absolute proportion of participants beginning to breastfeed in the first week of life was high among both intervention (median, 94.4%) and usual care (median, 90%) groups, indicating a potential ceiling effect on outcomes. A meta-analysis of 8 trials (n = 4607) found no statistically significant association with receiving a breastfeeding support intervention and any breastfeeding at 12 months, compared with usual care (RR, 1.04 [95% CI, 0.91-1.18]; *I*² = 0.0%).^{24,33,56,59,71,77,99,108}

In the subset of trials that reported continuous measures of time to stopping breastfeeding, all trials reported that infants born to participants in the intervention groups were breastfed longer than those in the control groups, although most did not report these differences to be statistically significantly different.

Across all breastfeeding outcomes, there was no consistent evidence that the results varied by any prespecified population or intervention characteristics. Detailed results for the prevalence of breastfeeding for all time points by study can be found in eTable 7 in the Supplement.

Harms of Breastfeeding Interventions

Key Question 3. What are the harms of interventions to support breastfeeding?

Seven of the 90 included trials (n = 1404) commented on the occurrence of adverse events or lack of adverse events^{41,42,56,75,77,82,94}; 5 of these studies reported that no adverse events were reported or

that none occurred and no additional details were provided. In the remaining 2 studies, there was no evidence of increased feelings of anxiety, depressive symptoms, suicidal ideation, or suspicions of child abuse among intervention participants compared with those receiving usual care.^{42,77} Additionally, there was no evidence of differences in the prevalence of breastfeeding "problems" between those in the intervention vs usual care groups in 22 studies that reported these measures (n = 13 815).^{24,25,29,35,36,50,53,55,58,60,62,67-69,76,79,82,86,91,100,101,106}

Discussion

The results of this review are consistent with those from the 2016 USPSTF review of this evidence¹³ and indicate that interventions delivered by professionals and peers and those delivered remotely can increase the proportion of women who continue any breastfeeding or exclusive breastfeeding up to 6 months postpartum (Table 2). Only a minority of the included studies evaluated the effects of interventions on infant and maternal health outcomes. However, a robust evidence base of observational research outside this review supports the association between prolonged and exclusive breastfeeding and a host of infant¹⁴⁷ and maternal health¹⁴⁸ outcomes. There was no evidence of increased harm from taking part in the interventions, although potential harm was not routinely reported. While the goals of these interventions focused on empowering and helping individuals to both initiate and continue breastfeeding, it is important that interventionists respect families' individual decisions and remain flexible in supporting new parents and their feeding choices to not inflict undue harm.

The included RCTs represented women from developed countries, with differences in age, primiparity, race and ethnicity, and socioeconomic status. Approximately one-third of the trials were conducted in the United States, and most specifically enrolled Black or Hispanic women and those from socioeconomically disadvantaged backgrounds, who historically have lower prevalence of breastfeeding initiation and continuation. Most of the participants enrolled in the studies intended to initiate breastfeeding; therefore, it is unclear how applicable this evidence is to a wider population who may not be firm in their feeding intentions or decisions.

Table 2. Overall Summary of Evidence by Key Question					
No. of RCTs (No. of observations)	Study quality	Major limitations (includes reporting bias)	Consistency	Applicability	Summary of findings
KQ1: Do interventions to support breastfeeding improve child and maternal health outcomes?					
19 RCTs (n = 11 175)	Good: 5 Fair: 14	Infant health outcomes variably reported Most outcomes based on maternal recall Considerable range in follow-up from 4 wk to 1 y	Infant health outcomes: NA Maternal well-being: consistent, precise	Represents data from the US and abroad; US trials represent predominantly Black and Hispanic low-income individuals	Mixed results for the effects on infant gastrointestinal outcomes (2 trials): 1 trial (n = 182) found greater risk of ≥1 diarrheal episodes over 3 mo in usual care vs intervention groups (RR, 2.15 [95% CI, 1.16-3.97]), while the other trial (n = 338) found no difference between intervention and control groups at 1 y (22.7% vs 25.7%) One trial (n = 338) found no difference in risk of otitis media (43.6% vs 54.9%) or the number of health care visits for respiratory tract illnesses (76% vs 83.4%) at 1 y Eight trials reported lower rates of health care visits and hospitalizations among infants in intervention groups at up to 6 mo, although differences between groups were not statistically significant Nine trials (n = 2334) reported minimal differences between groups in maternal well-being at up to 3 mo postpartum
KQ2: Do interventions to support breastfeeding improve the initiation, duration, intensity, and exclusivity of breastfeeding?					
89 RCTs (n = 49 597)	Good: 28 Fair: 61	Clinical variation in samples Lack of detail regarding measurement of breastfeeding, including recall period and definition of exclusivity Sparse reporting of breastfeeding at 12 mo	Consistent, precise	US trials (n = 33 [37% of trials]) represent predominantly Black and Hispanic low-income individuals Non-US trials have unclear applicability to US settings, given differences in usual care and underlying social and cultural differences	Breastfeeding support interventions were associated with a higher likelihood of exclusive breastfeeding initiation and of any and exclusive breastfeeding up to and at 6 mo There was no apparent effect on any breastfeeding initiation, but rates of breastfeeding initiation were relatively high in both intervention and control groups Few studies reported rates of breastfeeding at 1 y Any breastfeeding: Initiation: pooled RR, 1.01 (95% CI, 1.00-1.02); 37 trials (n = 15 006) <3 mo: pooled RR, 1.06 (95% CI, 1.03-1.08); 47 trials (n = 15 663) 3 mo to <6 mo: pooled RR, 1.09 (95% CI, 1.04-1.12); 40 trials (n = 17 580) 6 mo: pooled RR, 1.13 (95% CI, 1.05-1.22); 37 trials (n = 13 579) 12 mo: pooled RR, 1.04 (95% CI, 0.91-1.18); 8 trials (n = 4607) Exclusive breastfeeding: Initiation: pooled RR, 1.16 (95% CI, 1.05-1.29); 27 trials (n = 10 622) <3 mo: pooled RR, 1.21 (95% CI, 1.14-1.28); 51 trials (n = 17 580) 3 mo to <6 mo: pooled RR, 1.31 (95% CI, 1.17-1.46); 40 trials (n = 11 032) 6 mo: pooled RR, 1.46 (95% CI, 1.20-1.78); 37 trials (n = 14 398)
KQ3: What are the harms of interventions to support breastfeeding?					
28 RCTs (n = 15 011)	Good: 8 Fair: 20	Only 7 trials reported harms, and details about specific harms were lacking Problems or difficulties related to breastfeeding could be a harm (due to increased breastfeeding) or could be improved because of the intervention	Consistent, precise	Unclear applicability, given proportion of trials reporting harms	Six trials reported “no adverse events” related to the intervention One trial reported greater feelings of anxiety, decreased confidence, or concerns of confidentiality among intervention mothers and not among control group mothers Twenty-two trials reported the incidence of breastfeeding problems, generally finding that women in the intervention groups experienced fewer problems or difficulties than women in the usual care control groups
Abbreviations: NA, not applicable; RCT, randomized clinical trial; RR, risk ratio.					

There was no single optimal or representative intervention identified in this review. Rather, there was a wide range of approaches that were shown to improve rates of breastfeeding and are likely applicable to infant and maternal care in the United States. The interventions offered were diverse. Some consisted of only group prenatal education sessions. Some included only in-person support at and around the time of birth. Some consisted of telephone support alone. Some used text- and app-based contact. Some included in-person home visits. And some included multiple one-on-one sessions spanning the prenatal and postpartum periods. There was no evidence that the effects of the interventions were modified based on the individual intervention components, including who provided the intervention. It is likely that the effectiveness of any given intervention is dependent on the broader context of the target population and setting in which the support takes place.

Although the review was limited to interventions implemented at an individual level, there are several health care- and policy-level programs in the United States designed to help facilitate access to and equitable support. Such programs include the Ten Steps to Successful Breastfeeding and the Baby-Friendly Hospital Initiative¹⁴⁹; the US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infant, and Children¹⁵⁰; and the Nurse Family Partnership funded by US Medicare and individual State Health Departments.¹⁵¹ Systematic reviews and individual studies on the effectiveness of these interventions have shown mixed results,¹⁵²⁻¹⁵⁷ but such programs may offer additional support that

may help reduce disparities in access to the types of interventions reviewed here.

Limitations

This review was limited to fair- and good-quality RCTs evaluating breastfeeding support interventions that were provided in or feasible for primary care and did not include strategies such as hospital or workplace policies or strategies which are beyond the purview of a primary care clinician or practice. These supports, as well as primary care interventions that continue to support women beyond the immediate postpartum period and during major transitions (eg, return to work or placement in childcare), deserve further evaluation. Last, research is lacking on the impact that interventions may have on the mental health and well-being of the breastfeeding women and support persons. Routine collection of this information should be emphasized in ongoing research on breastfeeding support interventions.

Conclusions

The updated evidence confirms that breastfeeding support interventions can increase the prevalence of any and exclusive breastfeeding up to and at 6 months. Future efforts should focus on how to best provide this support consistently for all individuals who are making feeding decisions for their infants.

ARTICLE INFORMATION

Accepted for Publication: December 6, 2024.

Published Online: April 8, 2025.
doi:10.1001/jama.2024.27267

Author Contributions: Dr Patnode had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: All authors.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Patnode, Coppola, Iacocca.

Critical review of the manuscript for important intellectual content: Patnode, Senger, Coppola.

Statistical analysis: Patnode, Coppola, Iacocca.

Obtained funding: Patnode, Senger.

Administrative, technical, or material support: All authors.

Supervision: Patnode.

Conflict of Interest Disclosures: None reported.

Funding/Support: This research was funded under Contract 75Q80120D00004, Task Order 75Q80120F32004, from the Agency for Healthcare Research and Quality (AHRQ), US Department of Health and Human Services.

Role of the Funder/Sponsor: Investigators worked with US Preventive Services Task Force (USPSTF) members and AHRQ staff to develop the scope, analytic framework, and key questions for this review. AHRQ had no role in study selection, quality assessment, or synthesis. AHRQ staff provided project oversight, reviewed the report to ensure that the analysis met methodological standards, and distributed the draft for peer review. Otherwise, AHRQ had no role in the conduct of the study;

collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript findings. The opinions expressed in this document are those of the authors and do not reflect the official position of AHRQ or the US Department of Health and Human Services.

Additional Contributions: We gratefully acknowledge the following individuals for their contributions to this project: Brandy Peaker, MD, MPH, and Tina Fan MD, MPH (AHRQ); current and former members of the USPSTF who contributed to topic deliberations; and Evidence-based Practice Center staff members Melinda Davies, MAIS, Leslie Perdue, MPH, and Jill Pope, BA, for technical and editorial assistance at the Kaiser Permanente Center for Health Research. USPSTF members, peer reviewers, and federal partner reviewers did not receive financial compensation for their contributions.

Additional Information: Ms Iacocca's work on this article was completed while employed at the Center for Health Research, Kaiser Permanente. A draft version of this evidence report underwent external peer review from 4 content experts (Whitney Bender, MD [Virginia Commonwealth University]; Maya Bunik, MD, MSPH [Children's Hospital Colorado]; Ann L. Kellams, MD, IBCLC [University of Virginia Health System]; and Adam Lewkowicz, MD, MPH [Brown University]) and 3 federal partners (US Food and Drug Administration; Office of Research on Women's Health; and the National Institute on Minority Health and Health Disparities). Comments were presented to the USPSTF during its deliberation of the evidence and were considered in preparing the final evidence review.

Editorial Disclaimer: This evidence report is presented as a document in support of the

accompanying USPSTF recommendation statement. It did not undergo additional peer review after submission to JAMA.

REFERENCES

1. Meek JY, Noble L; Section on Breastfeeding. Policy statement: breastfeeding and the use of human milk. *Pediatrics*. 2022;150(1):e2022057988. doi:10.1542/peds.2022-057988
2. American Academy of Family Physicians. Breastfeeding, family physicians supporting (position paper). Published 2015. Accessed October 18, 2024. <https://www.aafp.org/about/policies/all/breastfeeding-position-paper.html>
3. American Academy of Family Physicians. Breastfeeding (policy statement). Published 2017. Accessed October 18, 2024. <https://www.aafp.org/about/policies/all/breastfeeding-policy-statement.html>
4. American College of Obstetricians and Gynecologists. ACOG Committee Opinion No. 756: optimizing support for breastfeeding as part of obstetric practice. *Obstet Gynecol*. 2018;132(4):e187-e196. doi:10.1097/AOG.0000000000002890
5. US Department of Agriculture and US Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. Published 2020. Accessed March 5, 2025. <https://www.dietaryguidelines.gov/>
6. World Health Organization and the United Nations Children's Fund (UNICEF). Indicators for assessing infant and young child feeding practices: definitions and measurement methods. Published 2021. Accessed March 5, 2025. <https://www.who.int/publications/i/item/9789240018389>

7. World Health Organization. Health topics: breastfeeding. Accessed April 16, 2020. https://www.who.int/health-topics/breastfeeding#tab=tab_1
8. Centers for Disease Control and Prevention, National Immunization Survey. CDC National Immunization Surveys (NIS) 2020 and 2021: rates of any and exclusive breastfeeding by socio-demographics among children born in 2021. Accessed August 26, 2024. https://www.cdc.gov/breastfeeding-data/?CDC_AAref_Val=https://www.cdc.gov/breastfeeding/data/nis_data/rates-any-exclusive-bf-socio-dem-2021.html
9. Chiang KV, Li R, Anstey EH, Perrine CG. Racial and ethnic disparities in breastfeeding initiation—United States, 2019. *MMWR Morb Mortal Wkly Rep*. 2021;70(21):769–774. doi:10.15585/mmwr.mm7021a1
10. Beauregard JL, Hamner HC, Chen J, Avila-Rodriguez W, Elam-Evans LD, Perrine CG. Racial disparities in breastfeeding initiation and duration among US infants born in 2015. *MMWR Morb Mortal Wkly Rep*. 2019;68(34):745–748. doi:10.15585/mmwr.mm6834a3
11. Anstey EH, Chen J, Elam-Evans LD, Perrine CG. Racial and geographic differences in breastfeeding—United States, 2011–2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(27):723–727. doi:10.15585/mmwr.mm6627a3
12. Radzinski S, Callister LC. Mother's beliefs, attitudes, and decision making related to infant feeding choices. *J Perinat Educ*. 2016;25(1):18–28. doi:10.1891/1058-1243.25.1.18
13. Patnode CD, Henninger ML, Senger CA, Perdue LA, Whitlock EP. *Primary Care Interventions to Support Breastfeeding: An Updated Systematic Review for the US Preventive Services Task Force: Evidence Synthesis No. 143*. Agency for Healthcare Research and Quality; 2016. AHRQ publication 15-05218-EF-1.
14. Patnode CD, Henninger ML, Senger CA, Perdue LA, Whitlock EP. Primary care interventions to support breastfeeding: updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. 2016;316(16):1694–1705. doi:10.1001/jama.2016.8882
15. US Preventive Services Task Force. Primary Care Interventions to Support Breastfeeding: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2016;316(16):1688–1693. doi:10.1001/jama.2016.14697
16. United States Preventive Services Task Force. US Preventive Services Task Force Procedure Manual. Published May 2021. Accessed March 10, 2025. <https://www.uspreventiveservicestaskforce.org/uspstf/methods-and-processes>
17. United States Preventive Services Task Force. Final research plan—breastfeeding: interventions. Published July 14, 2022. Accessed November 12, 2023. <https://www.uspreventiveservicestaskforce.org/uspstf/document/final-research-plan/breastfeeding-interventions>
18. Patnode CD, Senger CA, Coppola EL, Iacocca MO. *Interventions to Support Breastfeeding: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. Evidence Synthesis No. 242*. Agency for Healthcare Research and Quality; 2025. AHRQ publication 24-05316-EF-1.
19. United Nations Development Programme. Human Development Report 2019: beyond income, beyond averages, beyond today: inequalities in human development in the 21st century. Published December 2019. Accessed March 10, 2025. <https://hdr.undp.org/content/human-development-report-2019>
20. Hartung J, Knapp G. A refined method for the meta-analysis of controlled clinical trials with binary outcome. *Stat Med*. 2001;20(24):3875–3889. doi:10.1002/sim.1009
21. Peters JL, Sutton AJ, Jones DR, Abrams KR, Rushton L. Comparison of two methods to detect publication bias in meta-analysis. *JAMA*. 2006;295(6):676–680. doi:10.1001/jama.295.6.676
22. Berkman ND, Lohr KN, Ansari MT, et al. Grading the strength of a body of evidence when assessing healthcare interventions: an EPC update. *J Clin Epidemiol*. 2015;68(11):1312–1324. doi:10.1016/j.jclinepi.2014.11.023
23. Abbass-Dick J, Stern SB, Nelson LE, Watson W, Dennis CL. Coparenting breastfeeding support and exclusive breastfeeding: a randomized controlled trial. *Pediatrics*. 2015;135(1):102–110. doi:10.1542/peds.2014.1416
24. Abbass-Dick J, Sun W, Newport A, Xie F, Godfrey D, Goodman WM. The comparison of access to an eHealth resource to current practice on mother and co-parent teamwork and breastfeeding rates: a randomized controlled trial. *Midwifery*. 2020;90:102812. doi:10.1016/j.midw.2020.102812
25. Acar Z, Şahin N. Development of a mobile application-based breastfeeding program and evaluation of its effectiveness. *J Pediatr Nurs*. 2024;74:51–60. doi:10.1016/j.pedn.2023.11.011
26. Addicks SH, McNeil DW. Randomized controlled trial of motivational interviewing to support breastfeeding among Appalachian women. *J Obstet Gynecol Neonatal Nurs*. 2019;48(4):418–432. doi:10.1016/j.jogn.2019.05.003
27. Anderson AK, Damio G, Young S, Chapman DJ, Pérez-Escamilla R. A randomized trial assessing the efficacy of peer counseling on exclusive breastfeeding in a predominantly Latina low-income community. *Arch Pediatr Adolesc Med*. 2005;159(9):836–841. doi:10.1001/archpedi.159.9.836
28. Balaguer Martínez JV, Valcarlos Pérez I, Esquivel Ojeda JN, Hernández Gil A, Martín Jiménez MDP, Bernad Albareda M. Telephone support for breastfeeding by primary care: a randomised multicentre trial [in Spanish]. *An Pediatr (Engl Ed)*. 2018;89(6):344–351. doi:10.1016/j.anpede.2018.02.005
29. Baransel ES, Çalıkan BE. Effects of face-to-face education followed by mobile messaging to primiparas on maternal-neonatal care, breastfeeding, and motherhood experience: a randomized controlled trial. *Z Geburthilfe Neonatol*. 2024;228(3):278–285. doi:10.1055/a-2222-6568
30. Bender W, Levine L, Durnwald C. Text message-based breastfeeding support compared with usual care: a randomized controlled trial. *Obstet Gynecol*. 2022;140(5):853–860. doi:10.1097/AOG.0000000000004961
31. Bernal D. The effect of a peer counseling support program on breastfeeding initiation, duration and exclusivity among low-income Hispanic women. Brandman University; 2018.
32. Bonuck K, Stuebe A, Barnett J, Labbok MH, Fletcher J, Bernstein PS. Effect of primary care intervention on breastfeeding duration and intensity. *Am J Public Health*. 2014;104(suppl 1):S119–S127. doi:10.2105/AJPH.2013.301360
33. Bonuck KA, Freeman K, Trombley M. Randomized controlled trial of a prenatal and postnatal lactation consultant intervention on infant health care use. *Arch Pediatr Adolesc Med*. 2006;160(9):953–960. doi:10.1001/archpedi.160.9.953
34. Bunik M, Jimenez-Zambrano A, Solano M, et al. Mother's Milk Messaging™: trial evaluation of app and texting for breastfeeding support. *BMC Pregnancy Childbirth*. 2022;22(1):660. doi:10.1186/s12884-022-04976-6
35. Bunik M, Shobe P, O'Connor ME, et al. Are 2 weeks of daily breastfeeding support insufficient to overcome the influences of formula? *Acad Pediatr*. 2010;10(1):21–28. doi:10.1016/j.acap.2009.09.014
36. Cangöl E, Şahin NH. The effect of a breastfeeding motivation program maintained during pregnancy on supporting breastfeeding: a randomized controlled trial. *Breastfeed Med*. 2017;12:218–226. doi:10.1089/bfm.2016.0190
37. Carlsen EM, Kyhnaeb A, Renault KM, Cortes D, Michaelsen KF, Pryds O. Telephone-based support prolongs breastfeeding duration in obese women: a randomized trial. *Am J Clin Nutr*. 2013;98(5):1226–1232. doi:10.3945/ajcn.113.059600
38. Cauble JS, Herman A, Wick J, et al. A prenatal group based phone counseling intervention to improve breastfeeding rates and complementary feeding: a randomized, controlled pilot and feasibility trial. *BMC Pregnancy Childbirth*. 2021;21(1):521. doi:10.1186/s12884-021-03976-2
39. Chan MY, Ip WY, Choi KC. The effect of a self-efficacy-based educational programme on maternal breast feeding self-efficacy, breast feeding duration and exclusive breast feeding rates: a longitudinal study. *Midwifery*. 2016;36:92–98. doi:10.1016/j.midw.2016.03.003
40. Chapman DJ, Morel K, Bermúdez-Millán A, Young S, Damio G, Pérez-Escamilla R. Breastfeeding education and support trial for overweight and obese women: a randomized trial. *Pediatrics*. 2013;131(1):e162–e170. doi:10.1542/peds.2012-0688
41. Clarke JL, Ingram J, Johnson D, et al. The ABA intervention for improving breastfeeding initiation and continuation: feasibility study results. *Matern Child Nutr*. 2020;16(1):e12907. doi:10.1111/mcn.12907
42. Dennis CL, Hodnett E, Gallop R, Chalmers B. The effect of peer support on breast-feeding duration among primiparous women: a randomized controlled trial. *CMAJ*. 2002;166(1):21–28.
43. Meglio GD, McDermott MP, Klein JD. A randomized controlled trial of telephone peer support's influence on breastfeeding duration in adolescent mothers. *Breastfeed Med*. 2010;5(1):41–47. doi:10.1089/bfm.2009.0016
44. Di Napoli A, Di Lallo D, Fortes C, Franceschelli C, Armeni E, Guasticchi G. Home breastfeeding support by health professionals: findings of a randomized controlled trial in a population of Italian women. *Acta Paediatr*. 2004;93(8):1108–1114. doi:10.1111/j.1651-2227.2004.tb02725.x
45. Edwards RC, Thullen MJ, Korfmacher J, Lantos JD, Henson LG, Hans SL. Breastfeeding and complementary food: randomized trial of

- community doula home visiting. *Pediatrics*. 2013;132(suppl 2):S160-S166. doi:10.1542/peds.2013-1021P
46. Elliott-Rudder M, Pilotto L, McIntyre E, Ramanathan S. Motivational interviewing improves exclusive breastfeeding in an Australian randomised controlled trial. *Acta Paediatr*. 2014;103(1):e11-e16. doi:10.1111/apa.12434
47. Fan HSL, Ho MY, Ko RWT, et al. Feasibility and effectiveness of WhatsApp online group on breastfeeding by peer counsellors: a single-blinded, open-label pilot randomized controlled study. *Int Breastfeed J*. 2022;17(1):91. doi:10.1186/s13006-022-00535-z
48. Fiks AG, Gruver RS, Bishop-Gilyard CT, et al. A social media peer group for mothers to prevent obesity from infancy: the Grow2gether randomized trial. *Child Obes*. 2017;13(5):356-368. doi:10.1089/chi.2017.0042
49. Forster D, McLachlan H, Lumley J, Beanland C, Waldenström U, Amir L. Two mid-pregnancy interventions to increase the initiation and duration of breastfeeding: a randomized controlled trial. *Birth*. 2004;31(3):176-182. doi:10.1111/j.0730-7659.2004.00302.x
50. Forster DA, McLardie-Hore FE, McLachlan HL, et al. Proactive peer (mother-to-mother) breastfeeding support by telephone (Ring up About Breastfeeding Early (RUBY)): a multicentre, unblinded, randomised controlled trial. *EClinicalMedicine*. 2019;8:20-28. doi:10.1016/j.eclinm.2019.02.003
51. Franco-Antonio C, Calderón-García JF, Santano-Mogena E, Rico-Martín S, Cordovilla-Guardia S. Effectiveness of a brief motivational intervention to increase the breastfeeding duration in the first 6 months postpartum: randomized controlled trial. *J Adv Nurs*. 2020;76(3):888-902. doi:10.1111/jan.14274
52. Fu IC, Fong DY, Heys M, Lee IL, Sham A, Tarrant M. Professional breastfeeding support for first-time mothers: a multicentre cluster randomised controlled trial. *BJOG*. 2014;121(13):1673-1683. doi:10.1111/1471-0528.12884
53. Gagnon AJ, Dougherty G, Jimenez V, Leduc N. Randomized trial of postpartum care after hospital discharge. *Pediatrics*. 2002;109(6):1074-1080. doi:10.1542/peds.109.6.1074
54. Gijsbers B, Mesters I, Knottnerus JA, Kester ADM, van Schayck CP. The success of an educational program to promote exclusive breastfeeding for 6 months in families with a history of asthma: a randomized controlled trial. *Pediatr Asthma Allergy Immunol*. 2006;19(4):214-222. doi:10.1089/pai.2006.19.214
55. Graffy J, Taylor J, Williams A, Eldridge S. Randomised controlled trial of support from volunteer counsellors for mothers considering breast feeding. *BMJ*. 2004;328(7430):26. doi:10.1136/bmj.328.7430.26
56. Gross RS, Mendelsohn AL, Gross MB, Scheinmann R, Messito MJ. Randomized controlled trial of a primary care-based child obesity prevention intervention on infant feeding practices. *J Pediatr*. 2016;174:171-177.e2. doi:10.1016/j.jpeds.2016.03.060
57. Hans SL, Edwards RC, Zhang Y. Randomized controlled trial of doula-home-visiting services: impact on maternal and infant health. *Matern Child Health J*. 2018;22(suppl 1):105-113. doi:10.1007/s10995-018-2537-7
58. Henderson A, Stamp G, Pincombe J. Postpartum positioning and attachment education for increasing breastfeeding: a randomized trial. *Birth*. 2001;28(4):236-242. doi:10.1046/j.1523-536X.2001.00236.x
59. Hoffmann J, Günther J, Stecher L, et al. Effects of a lifestyle intervention in routine care on short- and long-term maternal weight retention and breastfeeding behavior—12 months follow-up of the cluster-randomized GeliS trial. *J Clin Med*. 2019;8(6):876. doi:10.3390/jcm8060876
60. Hopkinson J, Konefal Gallagher M. Assignment to a hospital-based breastfeeding clinic and exclusive breastfeeding among immigrant Hispanic mothers: a randomized, controlled trial. *J Hum Lact*. 2009;25(3):287-296. doi:10.1177/0890334409335482
61. Howell EA, Bodnar-Deren S, Balbierz A, Parides M, Bickel N. An intervention to extend breastfeeding among black and Latina mothers after delivery. *Am J Obstet Gynecol*. 2014;210(3):239.e1-239.e5. doi:10.1016/j.ajog.2013.11.028
62. Jolly K, Ingram L, Freemantle N, et al. Effect of a peer support service on breast-feeding continuation in the UK: a randomised controlled trial. *Midwifery*. 2012;28(6):740-745. doi:10.1016/j.midw.2011.08.005
63. Karaahmet AY, Bilgiç FS. Breastfeeding success in the first 6 months of online breastfeeding counseling after cesarean delivery and its effect on anthropometric measurements of the baby: a randomized controlled study. *Rev Assoc Med Bras (1992)*. 2022;68(10):1434-1440. doi:10.1590/1806-9282.20220540
64. Kellams AL, Gurka KK, Hornsby PP, et al. The impact of a prenatal education video on rates of breastfeeding initiation and exclusivity during the newborn hospital stay in a low-income population. *J Hum Lact*. 2016;32(1):152-159. doi:10.1177/0890334415599402
65. Kenyon S, Jolly K, Hemming K, et al. Lay support for pregnant women with social risk: a randomised controlled trial. *BMJ Open*. 2016;6(3):e009203. doi:10.1136/bmjopen-2015-009203
66. Kools EJ, Thijs C, Kester AD, van den Brandt PA, de Vries H. A breast-feeding promotion and support program a randomized trial in the Netherlands. *Prev Med*. 2005;40(1):60-70. doi:10.1016/j.ypmed.2004.05.013
67. Kronborg H, Maimburg RD, Væth M. Antenatal training to improve breast feeding: a randomised trial. *Midwifery*. 2012;28(6):784-790. doi:10.1016/j.midw.2011.08.016
68. Labarere J, Bellin V, Fourny M, Gagnaire JC, Francois P, Pons JC. Assessment of a structured in-hospital educational intervention addressing breastfeeding: a prospective randomised open trial. *BJOG*. 2003;110(9):847-852. doi:10.1111/j.1471-0528.2003.02539.x
69. Labarere J, Gelbert-Baudino N, Ayral AS, et al. Efficacy of breastfeeding support provided by trained clinicians during an early, routine, preventive visit: a prospective, randomized, open trial of 226 mother-infant pairs. *Pediatrics*. 2005;115(2):e139-e146. doi:10.1542/peds.2004-1362
70. Laliberté C, Dunn S, Pound C, et al. A randomized controlled trial of innovative postpartum care model for mother-baby dyads. *PLoS One*. 2016;11(2):e0148520. doi:10.1371/journal.pone.0148520
71. Lavender T, Baker L, Smyth R, Collins S, Spofforth A, Dey P. Breastfeeding expectations versus reality: a cluster randomised controlled trial. *BJOG*. 2005;112(8):1047-1053. doi:10.1111/j.1471-0528.2005.00644.x
72. Lewkowitz AK, López JD, Carter EB, et al. Impact of a novel smartphone application on low-income, first-time mothers' breastfeeding rates: a randomized controlled trial. *Am J Obstet Gynecol MFM*. 2020;2(3):100143. doi:10.1016/j.ajogmf.2020.100143
73. Lewkowitz AK, López JD, Stein RI, et al. Effect of a home-based lifestyle intervention on breastfeeding initiation among socioeconomically disadvantaged African American women with overweight or obesity. *Breastfeed Med*. 2018;13(6):418-425. doi:10.1089/bfm.2018.0006
74. Linares AM, Cartagena D, Rayens MK. Las Dos Cosas versus exclusive breastfeeding: a culturally and linguistically exploratory intervention study in Hispanic mothers living in Kentucky. *J Pediatr Health Care*. 2019;33(6):e46-e56. doi:10.1016/j.pedhc.2019.07.009
75. Little EE, Cioffi CC, Bain L, Legare CH, Hahn-Holbrook J. An infant carrier intervention and breastfeeding duration: a randomized controlled trial. *Pediatrics*. 2021;148(1):e2020049717. doi:10.1542/peds.2020-049717
76. Lucas R, Zhang Y, Walsh SJ, Evans H, Young E, Starkweather A. Efficacy of a breastfeeding pain self-management intervention: a pilot randomized controlled trial. *Nurs Res*. 2019;68(2):E1-E10. doi:10.1097/NNR.0000000000000336
77. Lutenbacher M, Elkins T, Dietrich MS. Using community health workers to improve health outcomes in a sample of Hispanic women and their infants: findings from a randomized controlled trial. *Hisp Health Care Int*. 2023;21(3):129-141. doi:10.1177/15404153221107680
78. Mattar CN, Chong YS, Chan YS, et al. Simple antenatal preparation to improve breastfeeding practice: a randomized controlled trial. *Obstet Gynecol*. 2007;109(1):73-80. doi:10.1097/01.AOG.0000249613.15466.26
79. McDonald SJ, Henderson JJ, Faulkner S, Evans SF, Hagan R. Effect of an extended midwifery postnatal support programme on the duration of breast feeding: a randomised controlled trial. *Midwifery*. 2010;26(1):88-100. doi:10.1016/j.midw.2008.03.001
80. McLachlan HL, Forster DA, Amir LH, et al. Supporting breastfeeding In Local Communities (SILC) in Victoria, Australia: a cluster randomised controlled trial. *BMJ Open*. 2016;6(2):e008292. doi:10.1136/bmjopen-2015-008292
81. McQueen KA, Dennis CL, Stremmler R, Norman CD. A pilot randomized controlled trial of a breastfeeding self-efficacy intervention with primiparous mothers. *J Obstet Gynecol Neonatal Nurs*. 2011;40(1):35-46. doi:10.1111/j.1552-6909.2010.01210.x
82. Milinco M, Travan L, Cattaneo A, et al; Trieste BN (Biological Nurturing) Investigators. Effectiveness of biological nurturing on early breastfeeding problems: a randomized controlled trial. *Int Breastfeed J*. 2020;15(1):21. doi:10.1186/s13006-020-00261-4

83. Miremborg H, Yirmiya K, Rona S, et al. Smartphone-based counseling and support platform and the effect on postpartum lactation: a randomized controlled trial. *Am J Obstet Gynecol MFM*. 2022;4(2):100543. doi:10.1016/j.ajogmf.2021.100543
84. Mottl-Santiago J, Dukhovny D, Cabral H, et al. Effectiveness of an enhanced community doula intervention in a safety net setting: a randomized controlled trial. *Health Equity*. 2023;7(1):466-476. doi:10.1089/heap.2022.0200
85. Muirhead PE, Butcher G, Rankin J, Munley A. The effect of a programme of organised and supervised peer support on the initiation and duration of breastfeeding: a randomised trial. *Br J Gen Pract*. 2006;56(524):191-197.
86. Nilsson IMS, Strandberg-Larsen K, Knight CH, Hansen AV, Kronborg H. Focused breastfeeding counselling improves short- and long-term success in an early-discharge setting: a cluster-randomized study. *Matern Child Nutr*. 2017;13(4):10. doi:10.1111/mcn.12432
87. Noel-Weiss J, Rupp A, Cragg B, Bassett V, Woodend AK. Randomized controlled trial to determine effects of prenatal breastfeeding workshop on maternal breastfeeding self-efficacy and breastfeeding duration. *J Obstet Gynecol Neonatal Nurs*. 2006;35(5):616-624. doi:10.1111/j.1552-6909.2006.00077.x
88. O'Reilly SL, McNestry C, McGuinness D, et al. Multicomponent perinatal breastfeeding support in women with BMI >25: the Latch On multi-centre randomised trial. *BJOG*. 2024;131(9):1197-1206. doi:10.1111/1471-0528.17782
89. Paul IM, Beiler JS, Schaefer EW, et al. A randomized trial of single home nursing visits vs office-based care after nursery/maternity discharge: the Nurses for Infants Through Teaching and Assessment After the Nursery (NITTANY) study. *Arch Pediatr Adolesc Med*. 2012;166(3):263-270. doi:10.1001/archpediatrics.2011.198
90. Pollard DL. Impact of a feeding log on breastfeeding duration and exclusivity. *Matern Child Health J*. 2011;15(3):395-400. doi:10.1007/s10995-010-0583-x
91. Puharić D, Malički M, Borovac JA, et al. The effect of a combined intervention on exclusive breastfeeding in primiparas: a randomised controlled trial. *Matern Child Nutr*. 2020;16(3):e12948. doi:10.1111/mcn.12948
92. Quinlivan JA, Box H, Evans SF. Postnatal home visits in teenage mothers: a randomised controlled trial. *Lancet*. 2003;361(9361):893-900. doi:10.1016/S0140-6736(03)12770-5
93. Reeder JA, Joyce T, Sibley K, Arnold D, Altindag O. Telephone peer counseling of breastfeeding among WIC participants: a randomized controlled trial. *Pediatrics*. 2014;134(3):e700-e709. doi:10.1542/peds.2013-4146
94. Sağlik M, Karaçam Z. Effectiveness of structured education and follow-up in the management of perceived breastmilk insufficiency: a randomized control trial. *Health Care Women Int*. 2023;44(3):276-294. doi:10.1080/07399332.2021.2007249
95. Santamaria-Martin MJ, Martin-Iglesias S, Schwarz C, et al; Grupo PROLACT. Effectiveness of a group educational intervention—PROLACT—in primary care to promote exclusive breastfeeding: a cluster randomized clinical trial. *BMC Pregnancy Childbirth*. 2022;22(1):132. doi:10.1186/s12884-022-04394-8
96. Sari C, Altay N. Effects of providing nursing care with web-based program on maternal self-efficacy and infant health. *Public Health Nurs*. 2020;37(3):380-392. doi:10.1111/phn.12712
97. Sari Ozturk C, Demir K. The effect of mandala activity and technology-based breastfeeding program on breastfeeding self-efficacy and mother-infant attachment of primiparous women: a randomized controlled study. *J Med Syst*. 2023;47(1):44. doi:10.1007/s10916-023-01942-3
98. Saucedo Baza A, Mignacca C, Delgado PE, et al. A technological approach to improved breastfeeding rates and self-efficacy: a randomized controlled pilot study. *J Hum Lact*. 2023;39(4):679-687. doi:10.1177/08903344231190625
99. Schwarz EB, Hoyt-Austin A, Fix M, Kair LR, Iwuagwu C, Chen MJ. Prenatal counseling on the maternal health benefits of lactation: a randomized trial. *Breastfeed Med*. 2024;19(1):52-58. doi:10.1089/bfm.2023.0219
100. Sevdá KO, Sevil İ. Continuous lactation support provided through the WhatsApp messaging application: a randomized controlled trial. *J Hum Lact*. 2023;39(4):666-678. doi:10.1177/08903344231192948
101. Şimsek-Çetinkaya Ş, Gümüş Çalış G, Kibris Ş. Effect of breastfeeding education program and nurse-led breastfeeding online counseling system (BMUM) for mothers: a randomized controlled study. *J Hum Lact*. 2024;40(1):101-112. doi:10.1177/08903344231210813
102. Stockdale J, Sinclair M, Kernohan WG, et al. Feasibility study to test Designer Breastfeeding™: a randomised controlled trial. *Evid Based Midwifery*. 2008;6(3):76-82. https://www.researchgate.net/publication/288672315_Feasibility_study_to_test_Designer_Breastfeeding_a_randomised_controlled_trial
103. Su LL, Chong YS, Chan YH, et al. Antenatal education and postnatal support strategies for improving rates of exclusive breastfeeding: randomised controlled trial. *BMJ*. 2007;335(7620):596. doi:10.1136/bmj.39279.656343.55
104. Taylor BJ, Gray AR, Galland BC, et al. Targeting sleep, food, and activity in infants for obesity prevention: an RCT. *Pediatrics*. 2017;139(3):e20162037. doi:10.1542/peds.2016-2037
105. Uscher-Pines L, Ghosh-Dastidar B, Bogen DL, et al. Feasibility and effectiveness of telelactation among rural breastfeeding women. *Acad Pediatr*. 2020;20(5):652-659. doi:10.1016/j.acap.2019.10.008
106. Wallace LM, Dunn OM, Alder EM, Inch S, Hills RK, Law SM. A randomised-controlled trial in England of a postnatal midwifery intervention on breast-feeding duration. *Midwifery*. 2006;22(3):262-273. doi:10.1016/j.midw.2005.06.004
107. Wambach KA, Aaronson L, Breedlove G, Domian EW, Rojjanasirrat W, Yeh HW. A randomized controlled trial of breastfeeding support and education for adolescent mothers. *West J Nurs Res*. 2011;33(4):486-505. doi:10.1177/0193945910380408
108. Wen LM, Baur LA, Simpson JM, Rissel C, Flood VM. Effectiveness of an early intervention on infant feeding practices and "tummy time": a randomized controlled trial. *Arch Pediatr Adolesc Med*. 2011;165(8):701-707. doi:10.1001/archpediatrics.2011.115
109. Wen LM, Rissel C, Xu H, et al. Effects of telephone and short message service support on infant feeding practices, "tummy time," and screen time at 6 and 12 months of child age: a 3-group randomized clinical trial. *JAMA Pediatr*. 2020;174(7):657-664. doi:10.1001/jamapediatrics.2020.0215
110. Wong KL, Tak Fong DY, Yin Lee IL, Chu S, Tarrant M. Antenatal education to increase exclusive breastfeeding: a randomized controlled trial. *Obstet Gynecol*. 2014;124(5):961-968. doi:10.1097/AOG.0000000000000481
111. Yesil Y, Ekşioglu A, Turfan EC. The effect of hospital-based breastfeeding group education given early perinatal period on breastfeeding self-efficacy and breastfeeding status. *J Neonatal Nurs*. 2023;29(1):81-90. doi:10.1016/j.jnn.2022.02.013
112. Abbass-Dick J. Evaluating the effectiveness of a coparenting breastfeeding support intervention (COSI) on exclusive breastfeeding rates at twelve weeks postpartum [dissertation]. University of Toronto; 2013.
113. Bonuck KA, Trombley M, Freeman K, McKee D. Randomized, controlled trial of a prenatal and postnatal lactation consultant intervention on duration and intensity of breastfeeding up to 12 months. *Pediatrics*. 2005;116(6):1413-1426. doi:10.1542/peds.2005-0435
114. Cahill AG, Haire-Joshu D, Cade WT, et al. Weight control program and gestational weight gain in disadvantaged women with overweight or obesity: a randomized clinical trial. *Obesity (Silver Spring)*. 2018;26(3):485-491. doi:10.1002/oby.22070
115. Ekambareshwar M, Mhrshahi S, Wen LM, et al. Facilitators and challenges in recruiting pregnant women to an infant obesity prevention programme delivered via telephone calls or text messages. *Trials*. 2018;19(1):494. doi:10.1186/s13063-018-2871-5
116. Forster D, McLachlan H, Davey M-A, et al. Ringing Up about Breastfeeding: a randomised controlled trial exploring early telephone peer support for breastfeeding (RUBY)—trial protocol. *BMC Pregnancy Childbirth*. 2014;14:177. doi:10.1186/1471-2393-14-177
117. Franco-Antonio C, Calderón-García JF, Vilar-López R, Portillo-Santamaría M, Navas-Pérez JF, Cordovilla-Guardia S. A randomized controlled trial to evaluate the effectiveness of a brief motivational intervention to improve exclusive breastfeeding rates: Study protocol. *J Adv Nurs*. 2019;75(4):888-897. doi:10.1111/jan.13917
118. Franco-Antonio C, Santano-Mogena E, Chimento-Díaz S, Sánchez-García P, Cordovilla-Guardia S. A randomised controlled trial evaluating the effect of a brief motivational intervention to promote breastfeeding in postpartum depression. *Sci Rep*. 2022;12(1):373. doi:10.1038/s41598-021-04338-w
119. Griffin LB, López JD, Ranney ML, Macones GA, Cahill AG, Lewkowicz AK. Effect of novel breastfeeding smartphone applications on breastfeeding rates. *Breastfeed Med*. 2021;16(8):614-623. doi:10.1089/bfm.2021.0012
120. Grimes HA, Forster DA, Shafiei T, Amir LH, McLardie-Hore F, McLachlan HL. Breastfeeding peer support by telephone in the RUBY randomised controlled trial: A qualitative exploration of

- volunteers' experiences. *PLoS One*. 2020;15(8):e0237190. doi:10.1371/journal.pone.0237190
121. Grimes HA, McLachlan HL, Forster DA, McLardie-Hore F, Mortensen K, Shafiei T. Implementing a successful proactive telephone breastfeeding peer support intervention: volunteer recruitment, training, and intervention delivery in the RUBY randomised controlled trial. *Int Breastfeed J*. 2021;16(1):90. doi:10.1186/s13006-021-00434-9
 122. Grimes HA, Shafiei T, McLachlan HL, Forster DA. Volunteers' experiences of providing telephone-based breast-feeding peer support in the RUBY randomised controlled trial. *Public Health Nutr*. 2020;23(16):3005-3015. doi:10.1017/S136898002000124X
 123. Gruver RS, Bishop-Gilyard CT, Lieberman A, et al. A social media peer group intervention for mothers to prevent obesity and promote healthy growth from infancy: development and pilot trial. *JMIR Res Protoc*. 2016;5(3):e159. doi:10.2196/resprot.5276
 124. Günther J, Hoffmann J, Kunath J, et al. Effects of a lifestyle intervention in routine care on prenatal dietary behavior—findings from the cluster-randomized GeliS trial. *J Clin Med*. 2019;8(7):960. doi:10.3390/jcm8070960
 125. Hoffmann J, Günther J, Geyer K, et al. Effects of a lifestyle intervention in routine care on prenatal physical activity—findings from the cluster-randomised GeliS trial. *BMC Pregnancy Childbirth*. 2019;19(1):414. doi:10.1186/s12884-019-2553-7
 126. Hornsby PP, Gurka KK, Conaway MR, Kellams AL. Reasons for early cessation of breastfeeding among women with low income. *Breastfeed Med*. 2019;14(6):375-381. doi:10.1089/bfm.2018.0206
 127. Howell EA, Balbierz A, Wang J, Parides M, Zlotnick C, Leventhal H. Reducing postpartum depressive symptoms among Black and Latina mothers: a randomized controlled trial. *Obstet Gynecol*. 2012;119(5):942-949. doi:10.1097/AOG.0b013e318250ba48
 128. Jolly K, Ingram J, Clarke J, et al. Protocol for a feasibility trial for improving breast feeding initiation and continuation: assets-based infant feeding help before and after birth (ABA). *BMJ Open*. 2018;8(1):e019142. doi:10.1136/bmjopen-2017-019142
 129. Kellams AL, Gurka KK, Hornsby PP, Drake E, Conaway MR. A randomized trial of prenatal video education to improve breastfeeding among low-income women. *Breastfeed Med*. 2018;13(10):666-673. doi:10.1089/bfm.2018.0115
 130. Kunath J, Günther J, Rauh K, et al. Effects of a lifestyle intervention during pregnancy to prevent excessive gestational weight gain in routine care—the cluster-randomised GeliS trial. *BMC Med*. 2019;17(1):5. doi:10.1186/s12916-018-1235-z
 131. Lewkowicz AK, López JD, Werner EF, et al. Effect of a novel smartphone application on breastfeeding rates among low-income, first-time mothers intending to exclusively breastfeed: secondary analysis of a randomized controlled trial. *Breastfeed Med*. 2021;16(1):59-67. doi:10.1089/bfm.2020.0240
 132. Lok KY, Ko RW, Fan HS, et al. Feasibility and acceptability of an online WhatsApp support group on breastfeeding: protocol for a randomized controlled trial. *JMIR Res Protoc*. 2022;11(3):e32338. doi:10.2196/32338
 133. Lucchini-Raies C, Marquez-Doren F, Beca P, Perez JC, Campos S, Lopez-Dicastillo O. The CRIAA program complex intervention in primary care to support women and their families in breastfeeding: study protocol for a pilot trial. *J Adv Nurs*. 2020;76(12):3641-3653. doi:10.1111/jan.14534
 134. MacArthur C, Jolly K, Ingram L, et al. Antenatal peer support workers and initiation of breast feeding: cluster randomised controlled trial. *BMJ*. 2009;338:b131. doi:10.1136/bmj.b131
 135. Martín-Iglesias S, Santamaría-Martín MJ, Alonso-Álvarez A, et al. Effectiveness of an educational group intervention in primary healthcare for continued exclusive breast-feeding: PROLACT study. *BMC Pregnancy Childbirth*. 2018;18(1):59. doi:10.1186/s12884-018-1679-3
 136. McLachlan HL, Forster DA, Amir LH, et al. Supporting breastfeeding In Local Communities (SILC): protocol for a cluster randomised controlled trial. *BMC Pregnancy Childbirth*. 2014;14:346. doi:10.1186/1471-2393-14-346
 137. McLardie-Hore FE, McLachlan HL, Shafiei T, Forster DA. Proactive telephone-based peer support for breastfeeding: a cross-sectional survey of women's experiences of receiving support in the RUBY randomised controlled trial. *BMJ Open*. 2020;10(10):e040412. doi:10.1136/bmjopen-2020-040412
 138. Messito MJ, Katzow MW, Mendelsohn AL, Gross RS. Starting early program impacts on feeding at infant 10 months age: a randomized controlled trial. *Child Obes*. 2020;16(S1):S4-S13. doi:10.1089/chi.2019.0236
 139. Mesters I, Gijbbers B, Bartholomew K, Knottnerus JA, Van Schayck OC. Social cognitive changes resulting from an effective breastfeeding education program. *Breastfeed Med*. 2013;8(1):23-30. doi:10.1089/bfm.2012.0011
 140. Noel-Weiss J, Bassett V, Cragg B. Developing a prenatal breastfeeding workshop to support maternal breastfeeding self-efficacy. *J Obstet Gynecol Neonatal Nurs*. 2006;35(3):349-357. doi:10.1111/j.1552-6909.2006.00053.x
 141. O'Reilly SL, O'Brien EC, McGuinness D, et al. Latch On: a protocol for a multi-centre, randomised controlled trial of perinatal support to improve breastfeeding outcomes in women with a raised BMI. *Contemp Clin Trials Commun*. 2021;22:100767. doi:10.1016/j.conctc.2021.100767
 142. Rauh K, Kunath J, Rosenfeld E, Kick L, Ulm K, Hauner H. Healthy living in pregnancy: a cluster-randomized controlled trial to prevent excessive gestational weight gain—rationale and design of the GeliS study. *BMC Pregnancy Childbirth*. 2014;14:119. doi:10.1186/1471-2393-14-119
 143. Ridgway L, Cramer R, McLachlan HL, et al. Breastfeeding support in the early postpartum: content of home visits in the SILC trial. *Birth*. 2016;43(4):303-312. doi:10.1111/birt.12241
 144. Wen LM, Baur LA, Rissel C, Wardle K, Alperstein G, Simpson JM. Early intervention of multiple home visits to prevent childhood obesity in a disadvantaged population: a home-based randomised controlled trial (Healthy Beginnings Trial). *BMC Public Health*. 2007;7:76. doi:10.1186/1471-2458-7-76
 145. Wen LM, Rissel C, Baur LA, et al. A 3-arm randomised controlled trial of Communicating Healthy Beginnings Advice by Telephone (CHAT) to mothers with infants to prevent childhood obesity. *BMC Public Health*. 2017;17(1):79. doi:10.1186/s12889-016-4005-x
 146. Zakarija-Grković I, Puharić D, Malički M, Hoddinott P. Breastfeeding booklet and proactive phone calls for increasing exclusive breastfeeding rates: RCT protocol. *Matern Child Nutr*. 2017;13(1):e12249. doi:10.1111/mcn.12249
 147. Patnode CD, Henikson NB, Webber EM, Blasi PR, Senger CA, Guirguis-Blake JM. *Breastfeeding and Health Outcomes for Infants and Children: Systematic Review*. (Prepared by the Kaiser Permanente Evidence-based Practice Center under Contract No. 75Q80120D00004.) Agency for Healthcare Research and Quality; March 2025. AHRQ publication 25-EHC014. doi:10.23970/AHRQEPSCSRBREASTFEEDING
 148. Feltner C, Weber RP, Stuebe A, Grodzensky CA, Orr C, Viswanathan M. Breastfeeding programs and policies, breastfeeding uptake, and maternal health outcomes in developed countries. Agency for Healthcare Research and Quality. Comparative Effectiveness Review No. 2010. Published July 2018. <https://www.ncbi.nlm.nih.gov/books/NBK525106/>
 149. Baby Friendly USA. About us: the Baby-Friendly Hospital Initiative. Accessed May 12, 2023. <https://www.babyfriendlyusa.org/about/>
 150. US Department of Agriculture. About WIC breastfeeding support. Accessed May 12, 2023. <https://wicbreastfeeding.fns.usda.gov/about>
 151. Nurse-Family Partnership. About us. Accessed August 13, 2023. <https://www.nursefamilypartnership.org/about/>
 152. Caulfield LE, Bennett WL, Gross SM, et al. *Maternal and Child Outcomes Associated With the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Report 22-EHC019*. Agency for Healthcare Research and Quality; 2022.
 153. Gross SM, Lerman JL, Hurley KM, et al. Breastfeeding outcomes associated with the Special Supplemental Nutrition Program for Women, Infants, and Children: a systematic review. *Acad Pediatr*. 2023;23(2):244-260. doi:10.1016/j.acap.2022.10.008
 154. Gleason S, Wilkin MK, Sallack L, Whaley SE, Martinez C, Paolicelli C. Breastfeeding duration is associated with WIC site-level breastfeeding support practices. *J Nutr Educ Behav*. 2020;52(7):680-687. doi:10.1016/j.jneb.2020.01.014
 155. Parasuraman S, Lebrun-Harris L, Jones J. Breastfeeding initiation, duration, and exclusivity among WIC-eligible populations. *Health Serv Res*. 2020;55(S1):30-31. doi:10.1111/1475-6773.13366
 156. Borger C, Weinfield NS, Paolicelli C, Sun B, May L. Prenatal and postnatal experiences predict breastfeeding patterns in the WIC Infant and Toddler Feeding Practices Study-2. *Breastfeed Med*. 2021;16(11):869-877. doi:10.1089/bfm.2021.0054
 157. Assibey-Mensah V, Suter B, Thevenet-Morrison K, et al. Effectiveness of peer counselor support on breastfeeding outcomes in WIC-enrolled women. *J Nutr Educ Behav*. 2019;51(6):650-657. doi:10.1016/j.jneb.2019.03.005