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Review

The Baby-Friendly Hospital Initiative as an Intervention to Improve Breastfeeding Rates: A Review of the Literature

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Introduction: The Baby-Friendly Hospital Initiative (BFHI) is considered to be an evidence-based program that improves breastfeeding outcomes, but primary research on the topic has been limited. The purpose of this review was to evaluate the literature and synthesize findings to determine the effectiveness of the BFHI as an intervention to improve breastfeeding initiation, duration, and exclusivity.

Methods: A review of literature published from 1991 to October 2014 using MEDLINE, CINAHL, PsycINFO, and Web of Knowledge with the search term "Baby-Friendly Hospital Initiative." The 724 titles initially identified were reviewed using these inclusion criteria: English language, primary research, and available electronically or via interlibrary loan. Studies were excluded if they explicitly stated that they had omitted specific portions of the BFHI or did not fully implement the intervention; considered breastfeeding rather than the BFHI as an intervention; used the BFHI to improve neonatal intensive care unit outcomes specifically; or measured outcomes other than breastfeeding initiation, duration, or exclusivity. This yielded 25 studies for review.

Results: There are more studies that support the BFHI as an intervention to increase breastfeeding than there are studies that demonstrate no effect of the intervention. However, design weaknesses, settings outside the United States, and disparate methods impede the ability to reach firm conclusions regarding the effectiveness of the BFHI in improving breastfeeding initiation, duration, and exclusivity rates in the United States.

Discussion: Many of the studies regarding the effectiveness of the BFHI have been hampered by weak designs or methodologic limitations. Research conducted in the United States and employing experimental designs would help to more conclusively determine the effectiveness of the BFHI as an intervention to improve breastfeeding rates.

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Keywords: Baby-Friendly Hospital Initiative, breastfeeding initiation, breastfeeding duration, breastfeeding exclusivity

INTRODUCTION

Breastfeeding rates remain persistently low in the United States, despite a large body of evidence documenting the many benefits of breastfeeding for both infant and women.[1] Infants who breastfeed for 9 months or more have 30% lower odds of childhood obesity compared to infants who were never breastfed.[2] Breastfeeding has been associated with a decreased risk of otitis media, atopic dermatitis, gastroenteritis, severe lower respiratory tract infections, asthma, types 1 and 2 diabetes mellitus, childhood leukemia, sudden infant death syndrome, and necrotizing enterocolitis.[3] For breastfeeding women, the benefits include a reduction in the risk of breast and ovarian cancer.[3]

However, in 2011, although 79.2% of women in the United States breastfed in the early postpartum period, only 40.7% were breastfeeding exclusively by 3 months; and at 6 months, the rate of exclusive breastfeeding decreased to 18.8%.[4] By 2 days of life, 19.4% of breastfed newborns received supplemental formula.[4] In comparison, the Healthy People 2020 goal is that 81.9% of newborns should be breastfed at least once, 60.6% of infants should be breastfed for 6 months, and 34.1% should be breastfed for one year. The goals for breastfeeding exclusivity are 46.2% at 3 months and 25.5% at 6 months; the goal for the maximum number of neonates who receive supplementation within the first 2 days of life is 14.2%.

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The Baby-Friendly Hospital Initiative (BFHI) has been widely promoted as an intervention that improves breastfeeding rates. This article reviews the research that has evaluated the effectiveness of the BFHI as an intervention to improve breastfeeding initiation, duration, and exclusivity.

Background

The BFHI is a quality improvement program designed by the World Health Organization/United Nations International Emergency Children's Fund (WHO/UNICEF) and is intended to improve breastfeeding initiation, duration, and exclusivity. The program provides certification to institutions meeting the 10 Steps (Table 1), as evaluated by a panel of outside observers.[5] Since the launch of the program in 1991, more than 20,000 hospitals have been certified as Baby-Friendly worldwide.[6] In the United States, of the 3281 facilities that provide maternity care, 203 are certified as Baby-Friendly. Only 8.4% of newborns born in the United States are born in Baby-Friendly facilities.[7]

WHO/UNICEF state that the benefits of the BFHI are improved health outcomes for women and infants and increased maternal–infant bonding.[8] According to Baby Friendly USA, which is the certifying organization for the BFHI in the United States, the intended benefits to hospitals are: the delivery of patient-centered care; improved maternal-child health outcomes; improved patient satisfaction; elevated reputation and standards of the facility; development of a professional environment of competence; strengthening of leadership and teamwork skills; improved

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Quick Points

- Most primary research on the Baby-Friendly Hospital Initiative (BFHI) has been conducted outside the United States, and many have significant methodological limitations.
- Although the BFHI is widely considered to be an intervention that improves breastfeeding rates, the quality of the research to date limits the ability to reach this conclusion.
- Peer support, formal prenatal breastfeeding education, and needs-based informal postpartum support may be more effective than the BFHI for increasing breastfeeding rates.
- Measuring increases in breastfeeding initiation, as an outcome for the BFHI, confounds findings because an increase in exclusive breastfeeding in the hospital is a criterion for certification.

hospital scores on the national Maternity Practices in Infant Nutrition and Care survey, conducted by the Centers for Disease Control and Prevention (CDC); compliance with The Joint Commission maternity care standards and corporate compliance requirements; and achievement of Healthy People 2020 goals.[9] There are no reports in the literature documenting that BFHI-certified hospitals have accrued these benefits.

A majority of the literature regarding the BFHI has focused on the implementation of this program. Fewer studies have evaluated the influence of the program on breastfeeding outcomes, namely breastfeeding initiation, duration, and exclusivity. Thus, the purpose of this review is to critique the literature and synthesize findings to determine the effectiveness of the BFHI as an intervention to improve breastfeeding initiation, duration, and exclusivity.

METHODS

A search using the electronic databases MEDLINE, CINAHL, PsycINFO, and Web of Science for the years 1991 (when the BFHI started) to October 2014 was conducted in late 2014 using the PRISMA guidelines for literature collection. The search term was "Baby-Friendly Hospital Initiative." This search returned 724 titles. Titles were screened according to the predetermined inclusion criteria that articles had to appear in English, include primary research, and be available electronically or via interlibrary loan. PubMed currently catalogs articles published back to 1947. Thus, we were able to include articles that were not originally published electronically in 1991. Published and gray literature were included. *Gray literature* refers to literature not published in an academic journal (eg, poster presentations at conferences, graduate research housed in academic libraries). By using gray literature, publication bias can be reduced.[10]

Studies were excluded if they explicitly stated that they had omitted specific portions of the BFHI or did not fully implement the intervention; breastfeeding, rather than the BFHI, was used as an intervention to improve infant or maternal outcomes; the BFHI was used to improve neonatal intensive care unit outcomes; or the study measured different outcomes other than breastfeeding initiation, duration, or exclusivity.

After identification of the appropriate articles, each was reviewed for BFHI definition adherence, design, methods, results, and limitations. When considering the outcomes measured, only breastfeeding initiation, duration, and exclusivity were evaluated. The length of time measured for breastfeeding duration and exclusivity was noted. Methods were categorized by the type of data collection employed such as interview, questionnaire, medical record review, observation, or a standardized tool. The source of the breastfeeding data was also noted in the review and included mothers, health care providers, infant' medical records, or national data sets. The timing of the data collection in each study was noted because some authors collected data one time, whereas others collected data over multiple encounters. All of these categories were organized and are presented in Table 2.

Table 1. The 10 Steps to Successful Breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within one hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they are separated from their infants.
6. Give infants no food or drink other than breastmilk, unless medically indicated.
7. Practice *rooming in*: allow mothers and newborns to remain together 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no pacifiers or artificial nipples to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups, and refer mothers to them on discharge from the hospital or clinic.

Source: World Health Organization, United Nations International Emergency Children's Fund.[42]

DESCRIPTION OF THE STUDIES

A diagrammatic representation of the search strategy is presented in Figure 1.

A total of 637 articles were excluded as duplicates or by title review and another 48 articles were removed after abstract review, leaving 39 articles for full review. Fourteen articles were excluded at this level because they did not

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Abrahams et al, 2009[11] 14 developing nations	14 developing nations data from demographic and health surveys from 1986-2006. Data were collected from the 14 countries that could provide data regarding breastfeeding rates in 2 surveys prior to BFHI implementation and in 2 surveys after BFHI implementation.	Retrospective cohort	Exclusivity (2 months, 6 months)	I (ND) 2 months pp 6 months pp	No statistically significant difference in trends of exclusive breastfeeding rates before and after implementation of the BFHI.	Initiation: N/M Duration: N/M Exclusivity: No (LT)	International setting limits generalizability to the United States.

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Alam et al, 2002[12] Bangladesh	209	Prospective longitudinal cohort	Exclusivity (30, 150, > 150 days)	I (M) In-hospital 1, 2, 3, 4, 5 months pp	Mean duration of exclusive breastfeeding was 69.7 days among women who gave birth at a Baby-Friendly hospital vs 48.4 days among women who gave birth at a non-Baby-Friendly hospital ($P < .001$). Exclusive breastfeeding rate at 30 days was 82% among women giving birth at BFHI hospitals vs 50% among women giving birth at non-BFHI hospitals (no *P* value reported). Exclusive breastfeeding rate at 150 days was 16% among women giving birth at BFHI hospitals vs 6% among women giving birth at non-BFHI hospitals (no *P* value reported). Exclusive breastfeeding rate at >150 days was 8% among women giving birth at BFHI hospitals vs 6% among women giving birth at non-BFHI hospitals (no *P* value reported).	Initiation: N/M Duration: N/M Exclusivity: Yes (LT)	International setting limits generalizability to the United States. No *P* values reported for many statistics inhibits the ability to interpret the statistical significance of the findings.

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Bartington et al, 2006[14] United Kingdom	17,359	Retrospective cohort	Initiation Exclusivity (one month)	I (M) 9 months pp	Women who gave birth in a BFHI-accredited hospital were 10% (95% CI, 1.05-1.15) more likely to initiate breastfeeding than those who gave birth in a noncertified hospital. No statistically significant difference in the likelihood of any breastfeeding at one month between women giving birth at a BFHI-certified hospital and those giving birth at a non-BFHI hospital (aOR, 0.96; 95% CI, 0.84-1.09).	Initiation: Yes Duration: No (ST) Exclusivity: N/M	International setting limits generalizability to the United States.
Bosnjak et al, 2004[15] Croatia	7414	Retrospective cohort	Duration (1, 3, 6, 9, 12 months)	MR (I) 1, 3, 6, 9, 12 months pp	No statistically significant difference in one- and 3-month breastfeeding rates between infants born at the same institution before and after Baby-Friendly certification. Breastfeeding rates increased at 6 months (11.46%-28.36%), 9 months (6.14%-14.71%), and 12 months (2.24%-3.48%) between infants born at the same institution before and after Baby-Friendly certification ($P < .05$).	Initiation: N/M Duration: No at one (ST) and 3 months. Yes at 6, 9, 12 months (LT) Exclusivity: N/M	International setting limits generalizability to the United States.

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Braun et al, 2003[16] Brazil	437	Before-after	Duration (4 months) Exclusivity (one month)	I (M) In-hospital, 1, 2, 4, 6 months pp	Women who gave birth at a BFHI hospital were 45% more likely to breastfeed at 4 months than those who gave birth at a non-BFHI hospital (Cox hazard ratio [HR], 1.55; 95% CI, 1.16-2.07). Women who gave birth at a BFHI hospital were 33% more likely to exclusively breastfeed at one month than those who gave birth at a non-BFHI hospital (Cox HR, 1.66; 95% CI, 1.40-1.98).	Initiation: N/M Duration: Yes (LT) Exclusivity: Yes (ST)	International setting limits generalizability to the United States. Use of one hospital is a source of possible selection bias. Before-after design limits causal inference.
Broadfoot et al, 2005[17] Scotland	464,246	Cross-sectional	Duration (7 days)	MR (I) 6-7 days of life	Breastfeeding at 7 days was higher among women who gave birth at a certified hospital than at a noncertified hospital (49.4% vs 42.0%). aOR for breastfeeding at 7 days: 1.28 (95% CI, 1.24-1.31).	Initiation: N/M Duration: Yes (ST) Exclusivity: N/M	International setting limits generalizability to the United States. Cross-sectional design limits causal inference. Measurement of breastfeeding outcomes at 6-7 days of life provides limited information about breastfeeding outcomes.

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Brodribb et al, 2013[18] Australia	6752	Retrospective cohort	Initiation Duration (1, 4 months) Exclusivity (1, 4 months)	Q (M) 4 months pp	Breastfeeding initiation rates did not differ between women giving birth in Baby-Friendly and non-Baby-Friendly hospitals. Women who gave birth in a Baby-Friendly hospital had statistically significantly lower odds of breastfeeding at one and 4 months (OR of breastfeeding at one month, 0.74; 95% CI, 0.63-0.88; OR of breastfeeding at 4 months, 0.81; 95% CI, 0.72-0.92). After adjusting for significant univariate variables, women who gave birth in a BFHI hospital continued to have lower odds of breastfeeding at one month (aOR, 0.72; 95% CI, 0.58-0.90), but there was no difference in the odds of breastfeeding at 4 months (aOR, 0.90; 95% CI, 0.76-1.07).	Initiation: No Duration: No (BFHI had a negative association with duration) (ST and LT) Exclusivity: No (ST and LT)	International setting limits generalizability to the United States.

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Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
					Women who gave birth in a Baby-Friendly hospital had statistically significantly higher odds of exclusively breastfeeding at one month, although there was no difference between the groups at 4 months (OR of exclusive breastfeeding at one month, 1.26; 95% CI, 1.11-1.42; OR of breastfeeding at 4 months, 0.99; 95% CI, 0.87-1.12). After adjusting for significant univariate variables, there was no difference in one-month or 4-month exclusive breastfeeding rates (aOR for one-month exclusivity, 1.14; 95% CI, 0.97-1.34; aOR for 4-month exclusivity, 1.17; 95% CI, 0.99-1.38).		
Budin et al, 2010[13] United States	113	Noncomparative descriptive design	Duration (2-3 weeks) Exclusivity (2-3 weeks)	Q (M) 2-3 weeks pp	88% of women were breastfeeding at 2-3 weeks after discharge. 60% of women were exclusively breastfeeding at 2-3 weeks after discharge.	Initiation: N/M Duration: Unclear (ST) Exclusivity: Unclear (ST) (In the absence of a comparator, the results are not interpretable as being related to the BFHI).	Small sample size at one hospital limits causal inference. Lack of comparator limits the ability to interpret the study's findings.

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Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Caldeira et al, 2007[19] Brazil	2128	Before-after	Duration (median) Exclusivity (median)	I (M) Up to 2 yrs pp	Breastfeeding duration increased from 8.9 months preintervention to 11.6 months postintervention ($P < .001$). Exclusive breastfeeding duration increased from 27 days preintervention to 3.5 months postintervention ($P < .001$).	Initiation: N/M Duration: Yes (LT) Exclusivity: Yes (LT)	International setting limits generalizability to the United States. Before-after design limits causal inference. Sample included 3 hospitals in one region of Brazil with no information regarding their selection criteria or other hospitals in the region. Possible selection bias.
DeJong et al, 2012[20] United States	842	Cross-sectional	Duration (3 months)	Q (M) 3 months pp	No statistically significant difference in 3-month breastfeeding rates between women who gave birth at a BFHI hospital and those who gave birth at a hospital with a mature breastfeeding program.	Initiation: N/M Duration: No (LT) Exclusivity: N/M	Convenience sample: possible selection bias.
DiGirolamo et al,[d] 2001[33] United States	1085	Longitudinal time series	Duration (6 weeks)	Q (M) Neonatal period 2 months pp	Women who experienced no Baby-Friendly practices at the time of birth were more likely to terminate breastfeeding early than women who experienced 5 Baby-Friendly practices (32.1% early termination vs 5.1% early termination).	Initiation: N/M Duration: Yes (LT) Exclusivity: N/M	Data collection method of surveying postpartum women allowed for collection of data regarding only 5 of the 10 steps.

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Duyan Camurdan et al, 2007[21] Turkey	555	Before-after	Duration (2, 4, 6 months) Exclusivity (15 days)	I (M) 15 days 2, 4, 6, 9, 12, 18, 24 months pp	There was a statistically significant increase in cumulative breastfeeding rates (breastfeeding duration) between the before-BFHI and after-BFHI groups, from a mean (standard deviation [SD]) of 17.83 (0.6) months to 21.17 (0.42) months ($P = .0036$). The difference in 15 day exclusive breastfeeding rates at pre- and postintervention was not statistically significant (93.1% vs 97.4%, $P >$. 05). The difference in 2-month exclusive breastfeeding rates at pre- and postintervention was not statistically significant (67.2% vs 76.1%, $P >$. 05). The difference in 4-month exclusive breastfeeding rates at pre- and postintervention was not statistically significant (45.6% vs 53.7%, $P >$. 05). The difference in 6-month exclusive breastfeeding rates at pre- and postintervention was not statistically significant (9.8% vs 9.3%, $P >$. 05). The difference in 15-day exclusive breastfeeding rates at pre- and postintervention was not statistically significant (93.1% vs 97.4%, $P >$ .05).	Initiation: N/M Duration: Yes (LT) Exclusivity: No (ST and LT)	International setting limits generalizability to the United States. The use of one hospital for data collection is a possible source of selection bias. Before-after design limits causal inference.

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Figueredo et al, 2013[32] Brazil	261	Cross-sectional study with no control group	Exclusivity (one week; one month; 2, 3, 4, 5, 6 months)	Q (M) One week I (M) 2, 3, 4, 5, 6 months pp	99% exclusive breastfeeding rate at discharge. 92% exclusive breastfeeding rate at one week. 75% exclusive breastfeeding rate at one month. 67% exclusive breastfeeding rate at 2 months. 52% exclusive breastfeeding rate at 3 months. 33% exclusive breastfeeding rate at 4 months. 20% exclusive breastfeeding rate at 5 months. 6% exclusive breastfeeding rate at 6 months.	Initiation: N/M Duration: N/M Exclusivity: Unclear (ST and LT) (In the absence of a comparator, the results are not interpretable as being related to the BFHI.)	International setting limits generalizability to the United States. Use of one hospital is a source of possible selection bias. Descriptive, noncomparative design limits causal inference.
Garcia-de-Leon-Gonzalez et al, 2011[22] Spain	1273	Time series	Initiation	Q, MR (P) Hospital discharge, 1, 2, 3, 5, 7 months pp	Women who gave birth postintervention were 20% more likely to breastfeed at the time of discharge than those who gave birth preintervention (95% CI, 0.12-0.33). Women who gave birth postintervention were 55% more likely to breastfeed at one-month postpartum than those who gave birth preintervention (95% CI, 0.38-0.79).	Initiation: Yes Duration: Yes (ST and LT) Exclusivity: N/M	International setting limits generalizability to the United States. The use of one hospital for data collection is a possible source of selection bias.

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Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
					Women who gave birth postintervention were 43% more likely to breastfeed at 2 months postpartum than those who gave birth preintervention (95% CI, 0.31-0.6). Women who gave birth postintervention were 29% more likely to breastfeed at 3 months postpartum than those who gave birth preintervention (95% CI, 0.21-0.4). Women who gave birth postintervention were 22% more likely to breastfeed at 5 months postpartum than those who gave birth preintervention (95% CI, 0.16-0.3). Women who gave birth postintervention were 14% more likely to breastfeed at 7 months postpartum than those who gave birth preintervention (95% CI, 0.09-0.2).		

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Hawkins et al, 2014[23] United States	25,327	Longitudinal matched cohort	Initiation Duration (4 weeks) Exclusivity (4 weeks)	Q-PRAMS (M) 4 months pp	No differences in breastfeeding initiation rates among women giving birth in BFHI institutions and non-BFHI institutions (adjusted coefficient, 0.024; 95% CI, 0.0-0.52). Breastfeeding initiation rates did increase by 3.8% among women with lower education who gave birth at a BFHI institution (adjusted coefficient, 0.038; 95% CI, 0.0-0.8), but not among women with higher education (adjusted coefficient, 0.002; 95% CI, −0.04 to 0.05). No differences in 4-week breastfeeding rates among women giving birth in BFHI institutions and non-BFHI institutions (adjusted coefficient, 0.006; 95% CI, −0.01 to 0.03). No difference in 4-week breastfeeding rates among women with lower education levels (adjusted coefficient, 0.027; 95% CI, −0.02 to 0.07). No difference in 4-month exclusivity rates among women giving birth in BFHI institutions and non-BFHI institutions (adjusted coefficient, 0.012; 95% CI, −0.01 to 0.03). 4-week exclusivity rates did increase by 4.5% among women with lower education who gave birth at a BFHI institution (adjusted coefficient, 0.045; 95% CI, 0.01-0.08), but not among women with higher education (adjusted coefficient, −0.023; 95% CI, −0.05 to 0.01).	Initiation: No (yes for women with lower education) Duration: No (ST) Exclusivity: No (yes for women with lower education) (ST)	States selected based on their participation in PRAMS and their ability to identify hospitals' BFHI status. Possible selection bias.

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Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Hofvander 2005[24] Sweden	National level statistics: no N provided. All hospitals in Sweden became BFHI-certified between 1993-1996; thus, national breastfeeding rates are compared before, during, and after this time period.	Time series	Duration (4, 6 months) Exclusivity (One week)	MR (ND) Timing not provided	4-month duration rates were higher postintervention than preintervention (83.2% vs 67.9%). 6-month duration rates were higher postintervention than preintervention (72.2% vs 50.7%). One-week exclusive breastfeeding rates were minimally higher postintervention than preintervention (92.6% vs 91.6%).	Initiation: N/M Duration: Yes (LT) Exclusivity: Yes (ST)	International setting limits generalizability to the United States.
Kramer et al, 2001[25] Belarus	17,046	Cluster randomized control trial	Duration (3, 6, 9, 12 months) Exclusivity (3, 6 months)	I, MR (M, I) One, 2, 3, 6, 9, 12 months pp	3-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (72.7% vs 60%; aOR, 0.52; 95% CI, 0.40-0.69). 6-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (49.8% vs 36.1%; aOR, 0.52; 95% CI, 0.39-0.71).	Initiation: N/M Duration: Yes (LT) Exclusivity: Yes (LT)	International setting limits generalizability to the United States. Only women who intended to breastfeed were eligible for enrollment. Possible selection bias. One-week inpatient postpartum stay may have influenced breastfeeding outcomes.

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
					9-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (36.1% vs 24.4%; aOR, 0.51; 95% CI, 0.36-0.73). 12-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (19.7% vs 11.4%; aOR, 0.47; 95% CI, 0.32-0.69). Exclusive 3-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (43.3% vs 6.4%; $P < .001$). Exclusive 6-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at control hospitals (7.9% vs 0.6%; $P = .01$).		

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Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Merewood et al, 2005[26] United States	29 hospitals. All 29 hospitals that were BFHI-certified in 2003 were surveyed regarding their initiation and exclusive breastfeeding rates, and then these rates were compared to the national norms.	Cross-sectional	Initiation Exclusivity (in hospital)	MR (I) In hospital	Breastfeeding initiation rates were higher at BFHI-certified hospitals than at all US hospitals (83.% vs 69.5%). Exclusive breastfeeding rates during the hospital stay were higher at BFHI-certified hospitals than at all US hospitals (78.4% vs 46.3%).	Initiation: Yes Duration: N/M Exclusivity: Yes (ST)	Small sample size (due to small available sample of BFHI-certified hospitals at the time of the study), limits causal inference. Data source for breastfeeding outcomes was the Ross Mothers' Survey, a data source collected and stored by a formula manufacturer. Possible sampling or data reporting bias. Measurement of breastfeeding outcomes in the hospital only provides limited information about breastfeeding outcomes.
Merten et al, 2005[27] Switzerland	3032	Cross-sectional and retrospective cohort	Duration (3, 5 months) Exclusivity (3, 5 months)	Q(M) 24-hour recall 3, 5 months pp	3-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at non-BFHI hospitals (72% vs 60%, $P = .012$). 5-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at non-BFHI hospitals (51% vs 42%, $P = .015$).	Initiation: N/M Duration: Yes (LT) Exclusivity: Yes (LT)	International setting limits generalizability to the United States.

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
					Exclusive 3-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those who gave birth at non-BFHI hospitals (60% vs 49%, $P = .033$). Exclusive 5-month breastfeeding rates were higher for women who gave birth at BFHI-certified hospitals than for those at non-BFHI hospitals (51% vs 42%, $P = .015$).		
Mydlilova et al, 2009[28] Czech Republic	660,355	Retrospective cross-sectional	Exclusivity (in hospital)	MR (I) Hospital discharge	Exclusive breastfeeding was higher in BFHI-certified hospitals than noncertified hospitals for each year measured. Although the number of certified hospitals grew nationally each year, the overall national rates of breastfeeding declined slightly over the study period.	Initiation: N/M Duration: N/M Exclusivity: Yes (ST)	International setting limits generalizability to United States. Measurement of breastfeeding outcomes at hospital discharge provides limited information regarding breastfeeding.

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Philipp et al, 2001[29] United States	200	Retrospective cohort	Initiation Exclusivity (in hospital)	MR (I) In hospital	Breastfeeding initiation increased from preintervention to postintervention (58% vs 86.5%, $P < 0.001$). Exclusive breastfeeding in hospital increased from preintervention to postintervention (5.5% vs 33.5%, $P < .001$).	Initiation: Yes Duration: N/M Exclusivity: Yes (ST)	Setting in one hospital for data collection is a source of possible selection bias. Measurement of breastfeeding outcomes in the hospital provides limited information regarding breastfeeding.
Pincombe et al,[e] 2008[34] Australia	317	Cross-sectional	Initiation Duration	I (M) See Findings section to right.	Duration of breastfeeding was not associated with early initiation of breastfeeding, breastfeeding on demand, or rooming in. Duration of breastfeeding was associated with exclusive breastfeeding and not being offered artificial nipples. Authors measured risk of weaning rather than specific duration or exclusivity time frames.	Initiation: N/M Duration: Unclear (measured outcome unclear) Exclusivity: N/M	International hospital limits the generalizability of findings to the United States. The use of one hospital for data collection is a source of possible selection bias. Noncomparative design limits causal inference. Breastfeeding outcomes reported as risk of weaning rather than standard methods of measuring breastfeeding outcomes. This inhibits the ability to relate these findings to other publications.
van der Merwe, 2012[30] South Africa	435	Cross-sectional	Exclusivity (<1, 1-2, 2-3, 3-4, 4-5, 5-6 months)	I/Q (M) One interview between 0-6 months pp	Exclusive breastfeeding rates were 60.1% among women giving birth in BFHI institutions vs 47.5% in non-BFHI institutions (no *P* value reported). The age of the infants whose mothers were interviewed varied considerably from newborns to age 6 months.	Initiation: N/M Duration: N/M Exclusivity: Unclear (no statistical significance reported)	International setting limits generalizability to United States. Cross-sectional design limits causal inference. No statistical significance reported for exclusive breastfeeding rates prevents the interpretation of the findings.

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
Venancio et al, 2012[31] Brazil	65,936	Longitudinal cohort	Exclusivity (One hour; first day home; 60, 90, 180 days)	Q (M) 24-hour recall used One, 60, 90, 180 days pp	One-hour exclusive breastfeeding rates were higher among women who gave birth at BFHI hospitals than among those who gave birth at non-BFHI hospitals (71.7% vs 65.1%, P = .0001). First-day-of-life exclusive breastfeeding rates were higher among women who gave birth at BFHI hospitals than among those who gave birth at non-BFHI hospitals (87.2% vs 82.3%, P = .0001). 60-day exclusive breastfeeding rates were higher among women who gave birth at BFHI hospitals than among those who gave birth at non-BFHI hospitals (68.9% vs 61.4%, P = .0002). 90-day exclusive breastfeeding rates were higher among women who gave birth at BFHI hospitals than among those who gave birth at non-BFHI hospitals (63.3% vs 59.7%, P = .0454).	Initiation: N/M Duration: N/M Exclusivity: Yes (ST and LT)	International setting limits generalizability to the United States.

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Table 2. Studies that Evaluated the Effect of the Baby-Friendly Hospital Initiative on Breastfeeding Initiation, Duration, and Exclusivity

Author, Date of Publication, Setting	N	Design	Outcome Measured	Data Collection: Method[a] (Source[b]) Timing	Findings	Do Results Support the BFHI?[c]	Study Limitations
					180-day exclusive breastfeeding rates were higher among women who gave birth at BFHI hospitals than among those who gave birth at non-BFHI hospitals (49.9% vs 47.1%, $P = .0286$).		
Wright et al,[f] 1996[35] United States	584	Before-after	Initiation Duration (One and 4 months)	I (M) In hospital, one and 4 months	Breastfeeding in hospital 73.6% postintervention vs 69.9%% preintervention ($P > .01$). Not statistically significant. Duration was measured in association with the number of BFHI practices experienced by women. No duration data was available for the pre-BFHI group.	Initiation: No Duration: Unclear (no comparator) Exclusivity: Unclear (no comparator)	Timing of study predates BFHI program; therefore, the setting was not BFHI-certified. Setting in one hospital in the United States limits the generalizability of findings. Before-after design limits causal inference. Survey tools were not the same at the 2 data collection points. Possible instrumentation bias.

Abbreviations: aOR, adjusted odds ratio; BFHI, Baby-Friendly Hospital Initiative; CI, confidence interval; HR, hazard ratio; pp, postpartum, PRAMS, Pregnancy Risk Assessment Monitoring System.
[a]Codes used for data collection methods: I = interview, Q = questionnaire, MR = medical record review.
[b]Codes used for data source: M = mother, P = provider, I = newborn or infant medical record, ND = national database.
[c]Codes used for interpretation of results: N/M = not measured; ST = short-term; LT = long-term.
[d]Steps 4 and 6-9 were measured.
[e]Steps 4-9 were measured
[f]Steps 1-10 were implemented, but the facility was not yet BFHI-certified.

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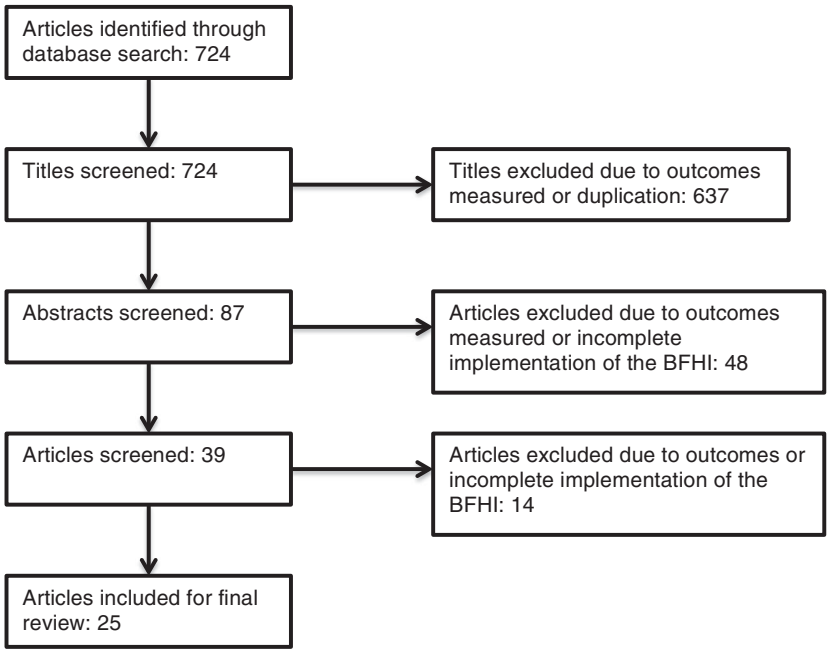


Figure 1. PRISMA Diagram for Search Method

Abbreviation: BFHI, Baby-Friendly Hospital Initiative PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

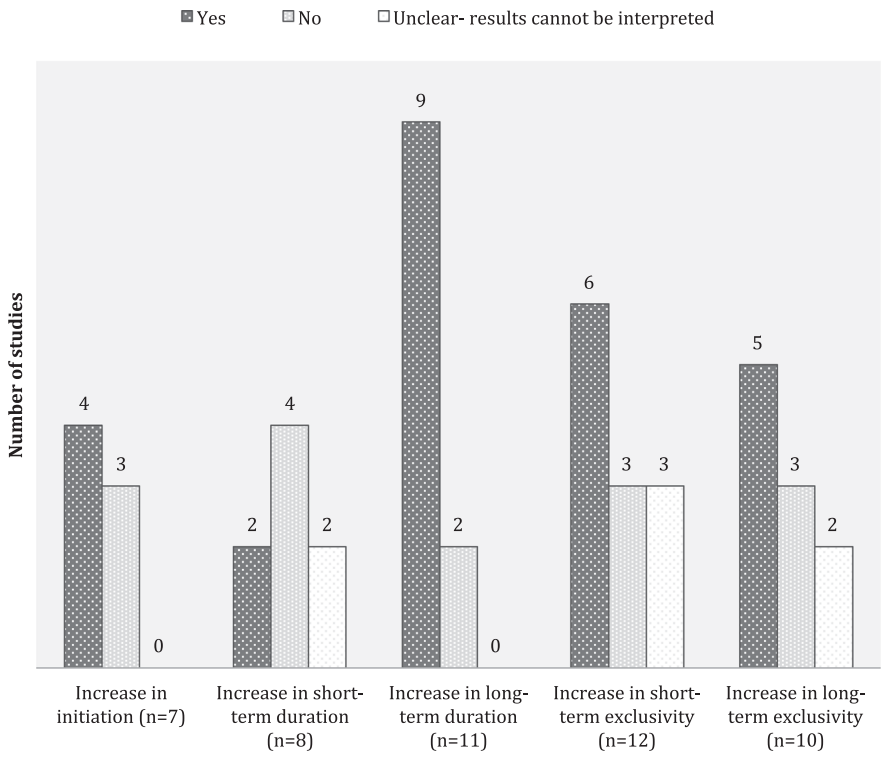


Figure 2. Number of Studies Demonstrating Selected Breastfeeding Outcomes

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specifically measure the targeted outcomes of breastfeeding initiation, duration, or exclusivity, or they did not fully implement the intervention, leaving 25 primary research studies of the BFHI as an intervention that were included for review.

Most (n = 22) studies used the standard definition of the BFHI in that the BFHI intervention included all 10 Steps.[11–32] Researchers usually checked the WHO/UNICEF database to see if a hospital was certified as Baby-Friendly; this database is readily available online. Two groups of researchers, however, used maternal reporting of hospital practices to define which institutions were Baby-Friendly.[33,34] When evaluating a hospital via maternal reporting, the administrative steps cannot be assessed (eg, step 1: Have a written breastfeeding policy that is routinely communicated to all health care staff). One group measured the influence of all implemented 10 Steps on breastfeeding outcomes, although the hospital was not yet BFHI-certified.[35] This study, authored by Wright et al, was conducted between 1990 and 1993 as the BFHI was first being developed. Although researchers in these 3 studies[33–35] did not document full Baby-Friendly certification, they have been included in the review because they evaluate the influence of Baby-Friendly practices on the outcomes of interest; the lack of documented full certification is explained by the methods and timing of the study rather than by a lack of implementation of the full intervention.

Designs

Among the 25 studies that assessed the full BFHI as an intervention to improve breastfeeding initiation, duration, and exclusivity, the authors of one study employed a cluster randomized control design.[25] The majority of authors used a quasi-experimental design with a control group or a cohort design,[11,12,14,15,18,23,29,31] a time series design,[22,24,33] or a before-after or cross-sectional design.[13,16,17,19–21,26–28,30,32,34,35]

Setting

Seven studies among the 25 were conducted in the United States,[13,20,23,26,29,33,35] with the remaining 18 conducted in a variety of nations worldwide, including Bangladesh,[12] the United Kingdom,[14,17] Croatia,[15] Brazil,[16,19,31,32] Australia,[18,34] Turkey,[21] Spain,[22] Sweden,[24] Belarus,[25] Switzerland,[27] Czech Republic,[28] South Africa,[30] and a group of 14 developing countries.[11]

Measures and Sources of Data

Researchers used an assortment of methods to measure outcomes. Questionnaires (paper-and-pencil and electronic); interviews; review of medical records, including birth certificate and newborn screening data; and review of national public health databases were employed. Sources of breastfeeding data included maternal report, hospital staff, and infant medical records.

The timing of data collection ranged from one day postpartum to 24 months postpartum. Most commonly, data were collected in the hospital, either in the postpartum unit or in the pediatric outpatient clinic. Some studies included data collection by trained researchers or medical personnel in patients' homes.

The scope of the included studies varied greatly. Some researchers evaluated the impact of the BFHI on outcomes at one hospital, whereas others assessed the influence of the BFHI on city-wide, state-wide, or national breastfeeding indicators.

Only 2 studies attempted to present evidence that their methods had been validated. Hawkins et al used an existing data set, the Pregnancy Risk Assessment Monitoring System (PRAMS) of the CDC survey, rather than collecting new data.[23] When using a large data set such as this, the validity of the survey is publicly reported. In this case, the CDC states that the 95% confidence interval for the accuracy of this data is ± 3.5%.[37] The study by Kramer et al reported validating data collected via questionnaires by comparing questionnaire answers to findings in medical records or at maternal interview.[38] The fact that no other study included this kind of safeguard against human error or fabrication of findings minimizes the reliability of many studies' findings.

FINDINGS OF THE STUDIES

When taken as a whole, the majority of research included for review supports the BFHI as an intervention to increase breastfeeding initiation, long-term breastfeeding duration, and increased breastfeeding exclusivity rates (Figure 2). However, it is notable that most research did not support the BFHI as an intervention that improves short-term breastfeeding duration rates. In addition, there is only a small difference in the number of studies showing that the BFHI increases breastfeeding initiation rates and those showing that it does not have an effect on initiation (4 vs 3, respectively).

The seminal study that assessed the effectiveness of the BFHI was published by Kramer et al in 2001.[25] A cluster-randomized design was used to randomly assign 31 hospitals in the Republic of Belarus to either the BFHI intervention group or standard care. Once hospitals were assigned to a group, mother–newborn pairs (N = 17,046) were enrolled in the study if the newborns were full-term, singletons, weighed 2500 grams or more, and the woman intended to breastfeed. Data were collected from mother–infant pairs' medical records during the postpartum visit and then at one, 2, 3, 6, 9, and 12 months after birth. The outcomes of interest were numerous and focused on both breastfeeding and infant health. Those that are relevant to this review were the prevalence of any breastfeeding at 3, 6, 9, and 12 months of age and the prevalence of exclusive and predominant breastfeeding at 3 and 6 months. At 3 months, more women in the BFHI group were breastfeeding compared to the number of women in the control group who were breastfeeding (72.7% vs 60.0%; adjusted odds ratio [aOR], 0.52; 95% confidence interval [CI], 0.40-0.69). Similar findings were noted for any breastfeeding at 6 months (49.8% vs 36.1%; aOR, 0.52; 95%, CI, 0.39-0.71). At 9 months, the breastfeeding rates were 36.1% versus 24.2% (aOR, 0.51; 95% CI, 0.36-0.73); and at 12 months the breastfeeding rates were also higher among the women who gave birth at a BFHI institution compared to those who gave birth in a control hospital (19.7% vs 11.4%; aOR, 0.47; 95% CI,

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0.32-0.69). The proportion of women exclusively breastfeeding at 3 months was 7 times higher in the experimental group (43.3% vs 6.4%; $P < .001$ by unpaired t test) and more than 12 times higher at 6 months (7.9% vs 0.6%; $P = .01$) than the control group.

Another large and well-designed study published by Venancio et al in 2012 used national-level public health data collected from 65,936 newborns and infants in Brazil to examine breastfeeding in the first hour of life; exclusive breastfeeding on the first day after hospital discharge; exclusive breastfeeding in infants younger than 2, 3, and 6 months of age; and pacifier use in infants younger than 6 months of age.[31] Data were collected through interviews of the infants' guardians when they were brought to a site for vaccinations. This study found that infants born at BFHI facilities were 9% more likely to be breastfed in the first hour of life than were infants born in a non-BFHI facility (prevalence ratio [PR], 1.09; 95% CI, 1.06-1.11) and were 6% more likely to be breastfed in the first day home from the hospital (PR, 1.06; 95% CI, 1.04 to 1.09). Newborns and infants younger than 2 months of age were 13% more likely to be exclusively breastfed if born in a BFHI institution than if born at a non-BFHI institution (PR, 1.13; 95% CI, 1.07-1.20). Infants younger than 3 months of age were 8% more likely to be exclusively breastfed (PR, 1.08; 95% CI, 1.03-1.13), and infants younger than 6 months of age were 6% more likely to be exclusively breastfed (PR, 1.06; 95% CI, 1.01-1.11) when they were born at a BFHI facility. The findings of these 2 very large studies appear compelling. However, a careful look at the full body of research regarding the effectiveness of the BFHI and its impact on the outcomes of breastfeeding initiation, duration, and exclusivity reveals a more nuanced interpretation.

Breastfeeding Initiation

Seven studies specifically measured breastfeeding initiation as an outcome. Among them, 4 found a statistically significant increase in breastfeeding initiation after implementation of the BFHI.[14,22,26,29] These 4 studies vary in terms of the strength of their designs, sample sizes, and settings; they include a small cross-sectional survey of BFHI hospitals in the United States and a large retrospective cohort study in Scotland. No significant change in breastfeeding initiation rates after BFHI implementation as compared to preimplementation rates was noted in 3 of the studies, among which 2 were large cohort studies.[18,23,35]

A recent longitudinal matched cohort study published in 2014 by Hawkins et al used data from the PRAMS survey.[23] This work stands apart from previous studies on breastfeeding initiation because it used a large population-based sample that allowed the authors to directly associate BFHI certification with breastfeeding outcomes. Additionally, participants were compared based on educational attainment and race/ethnicity, allowing for a more detailed interpretation of the findings. In order to be included in the study, states had to release hospital identifiers to the researchers, which allowed the researchers to match breastfeeding outcomes with the BFHI certification status of the hospitals where women gave birth. Five states met the inclusion criteria (Alaska, Maine, Nebraska, Ohio, Washington). The final sample included 11,723 women who gave birth in 13 BFHI institutions and 13,604 women who gave birth in 19 matched non-BFHI institutions. This large sample from 5 diverse states in the United States may provide the most internally and externally valid data about the impact of the BFHI on breastfeeding initiation and short-term duration in the United States. The researchers found no difference in breastfeeding initiation rates between women who gave birth at BFHI institutions and non-BFHI institutions (adjusted coefficient 0.024; 95% CI, 0.00-0.51). They did note that breastfeeding initiation rates increased by 3.8% among women with lower education who gave birth at BFHI institutions when compared with non-BFHI institutions (adjusted coefficient, 0.38; 95% CI, 0.00-0.08), but not among women with higher education (adjusted coefficient, 0.002; 95% CI, -0.04 to 0.05).

Breastfeeding Duration

When measuring breastfeeding duration, researchers differed significantly in the time periods they used to define *breastfeeding duration* and also varied in methods of measurement. Some measured short-term duration, whereas others measured breastfeeding duration up to one year. One study used the median to measure duration of breastfeeding,[19] and one measured a *likelihood of weaning*, calculated as an estimated hazard ratio using Kaplan-Meier curves for each Baby-Friendly practice.[34]

Among studies considering breastfeeding duration for one month or less (n = 8), results varied considerably. Four studies found no statistically significant differences in breastfeeding duration among women who gave birth in a BFHI institution and women who gave birth in a non-BFHI institution, including the large study from the United States by Hawkins et al.[14,15,18,23] Two studies found an increase in one-month breastfeeding rates after exposure to the intervention, including the one by Broadfoot et al in which the authors evaluated 33 maternity units in Scotland.[17,22] One study lacked the clarity of statistics that would allow a conclusion to be reached regarding the influence of the BFHI.[13]

The study authored by Brodribb et al found a negative association between the BFHI and short-term breastfeeding duration.[18] These authors used a retrospective cohort design and mailed a survey to all women who had a live birth in Queensland, Australia, between February 1, 2010, and May 31, 2010.[18] The sample included 6572 women out of a possible 20,056 who replied to the survey either by paper and pencil, online, or with telephone interview responses. The outcomes of interest were breastfeeding initiation, any breastfeeding, and exclusive breastfeeding rates at one and 4 months of age. Breastfeeding initiation rates did not differ between women who gave birth at BFHI facilities versus those who gave birth at non-BFHI facilities (96.2% vs 95.9%; odds ratio [OR], 0.92; 95% CI, 0.69-1.24). They also found that women who gave birth at BFHI facilities had significantly lower odds of any breastfeeding at one month (81.1% vs 84.8%; OR, 0.77; 95% CI, 0.66-0.90) and 4 months (62.9% vs 67.4%; OR, 0.82; 95% CI, 0.73-0.93) than those who gave birth at non-BFHI facilities. After adjusting for nonmodifiable maternal and infant characteristics, women who gave birth at a BFHI hospital continued to have statistically significant lower odds of any

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breastfeeding at one month (aOR, 0.72; 95% CI, 0.58-0.90), but there was no difference in breastfeeding at 4 months between the groups (aOR, 0.90; 95% CI, 0.76-1.07). The authors offered some possible reasons for these negative findings, including the BFHI may be less effective in nations where breastfeeding is already the norm; there may be a ceiling effect; or women who give birth at BFHI institutions may initiate breastfeeding without intent to continue.

Among studies that examined breastfeeding durations of longer than one month (n = 11), a majority supported an increase either in breastfeeding duration at a designated period in time (eg, 60 days, 3 months, 6 months) or an increase in the number of months of breastfeeding.[15,16,19,21,22,24,25,27,33] All but one of these studies were conducted outside the United States, though many used rigorous designs and large sample sizes. Two studies found no statistically significant differences between breastfeeding duration by women who gave birth at a BFHI institution versus women who gave birth at a non-BFHI institution: one was the large Australian study by Brobribb et al and the other a dissertation that looked at breastfeeding rates in counties of New York state.[18,20]

Bosjnak et al found no statistically significant difference in 3-month breastfeeding rates between infants born at the same institution before and after Baby-Friendly certification; but they did find statistically significant differences in rates of breastfeeding duration at 6, 9, and 12 months.[15]

Two different designs were used by the studies conducted by Caldeira et al[19] and Pincombe et al.[34] Caldeira et al measured median duration of breastfeeding in a study that compared breastfeeding rates before and after implementation of BFHI, rather than duration to a specific time frame.[19] These authors found median duration was longer among women who gave birth at BFHI institutions rather than at non-BFHI institutions. Pincombe et al measured the "likelihood of weaning" over time and associated that likelihood with a woman's experience with 6 of the 10 steps.[34] They found that the duration of breastfeeding was not associated with early initiation of breastfeeding (step 4), breastfeeding on demand (step 8), or rooming-in (step 7). They found that there was no association between the duration of breastfeeding and exclusive breastfeeding or duration and the restriction of artificial nipples (step 9).

Exclusive Breastfeeding

Exclusive breastfeeding was an outcome measure of several of the studies. As with the duration outcome, a wide variety of time frames was used to consider exclusive breastfeeding and ranged from exclusive breastfeeding in the hospital immediately after birth to 6 months after birth. One study reported the mean number of days of exclusive breastfeeding.[12] In addition, the methods for assessing exclusivity varied and were not well defined. Breastfeeding exclusivity information was collected from mothers, medical records, or by collecting data from providers. Among studies considering exclusive breastfeeding up to one month (n = 12), the majority—including the before-after study by Braun et al and the cross-sectional studies by Merewood et al and Mydlilova et al—demonstrated some positive effect of the BFHI on short-term exclusive breastfeeding.[16,24,26,28,29,31] Three studies, including the large studies by Brodribb et al (N = 6752) and Hawkins et al (N = 25,327), found no difference between the BFHI and non-BFHI groups,[14,18,21,23] and 3 studies lacked enough information to make an assumption about the influence of the BFHI on short-term exclusive breastfeeding.[13,30,32]

Hawkins et al found no difference overall in 4-week exclusive breastfeeding rates between women who gave birth at a BFHI institution and a non-BFHI institution in the United States.[23] However, there was a statistically significant 4.5% increase in breastfeeding exclusivity rates among women with lower educational attainment who gave birth at BFHI institutions compared to women with the same educational attainment who gave birth at non-BFHI institutions (adjusted coefficient, 0.045; 95% CI, 0.01-0.08).[23] Brodribb et al found that women in Australia who gave birth at BFHI hospitals had higher odds of exclusive breastfeeding at one month (OR, 1.24; 95% CI, 1.10-1.39); but after adjusting for nonmodifiable characteristics, there was no difference in the odds of exclusive breastfeeding between women who gave birth at BFHI and non-BFHI hospitals at one month (aOR, 1.14; 95% CI, 0.97-1.34).[18]

Ten studies considered long-term (longer than one month) exclusive breastfeeding rates. Among these, 5 articles, including the seminal works by Kramer et al and Merten et al, noted a positive influence of the BFHI on long-term rates.[12,19,25,27,31] Three studies found no difference in long-term exclusivity rates between women giving birth at a BFHI institution and those giving birth elsewhere[11,18,21] and 2 studies offered ambiguous results that inhibited interpretation.[30,32] Kramer et al had the strongest results documenting the influence of the BFHI on long-term exclusive breastfeeding rates.[25] This cluster randomized controlled study found statistically significant increases in 3- and 6-month exclusive breastfeeding rates among women who gave birth in BFHI institutions in Belarus. Meanwhile, the other large population-based study from Australia conducted by Brodribb et al found no statistically significant difference in 4-month exclusive breastfeeding rates between women giving birth at BFHI versus non-BFHI institutions using unadjusted and adjusted odds ratios.[18] Both the Kramer and Brodribb studies were well designed and included a large sample size. It is notable that none of the studies regarding long-term breastfeeding duration were conducted in the United States.

DISCUSSION

Considerable heterogeneity in definitions, design, methods, analysis, and outcomes was noted among studies; thus, it is not surprising that the results also are heterogeneous. Although it is difficult to reach definitive conclusions about the effectiveness of the BFHI based on the variety of research efforts to date, some trends do emerge.

A majority of the studies that assessed the effect of the BFHI did find that the program had a positive influence on breastfeeding outcomes. Of note, however, is that an increase in exclusive breastfeeding in the hospital is a criterion for Baby-Friendly certification. Thus, concluding that the intervention increases breastfeeding initiation employs a

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circular logic because the intervention itself cannot also be a measured outcome. It is more appropriate to consider the influence of the BFHI on breastfeeding duration. Duration and exclusivity, although more difficult to measure, are the outcomes that appear to have the greatest influence on health outcomes for women and children.

Prior reviews have considered studies that employed parts of the BFHI. This review attempted to restrict articles for consideration to only those implementing the full intervention. Three studies that evaluated the influence of full BFHI implementation, but without having BFHI certification, were included. Inclusion of studies found in the gray literature[13,20,30] with the published literature is a strength because bias is reduced. In addition, the inclusion of a recent work by authors who employed rigorous designs helps provide a current and more thorough review of the BFHI.

This review has some limitations. Although an attempt was made to consider all primary research on the BFHI as an intervention, some studies may have been overlooked. The use of a single reviewer raises the possibility of bias or error. Many of the studies supporting the intervention have weak designs, which may inappropriately influence the interpretation of the findings as a whole.

Although studies assessing full or part of the BFHI are plentiful, many areas remain open to exploration before recommending widespread efforts to increase BFHI adoption among hospitals in the United States. More research utilizing quasi-experimental or experimental designs conducted in the United States would help to generalize findings to the unique health care setting in this county. A meta-analysis that weighs the impact of the findings based on design, sample size, and methods of data analysis would be a valuable addition to the literature.

Clinical Implications

Many midwives, nurses, and physicians are active participants in the adoption and implementation of the BFHI at their institutions in the interest of improving breastfeeding outcomes, and in turn the health outcomes for infants and women. However, given the lack of certainty about the impact of the program, some clinicians may find that their efforts to improve breastfeeding might be better focused on other methods of improving breastfeeding initiation, duration, and exclusivity rates. Findings from reviews published by Cochrane and the Agency for Healthcare Research and Quality suggest that peer support, formal prenatal breastfeeding education, and needs-based informal postpartum support may be more effective methods of encouraging long-term breastfeeding success than the BFHI.[39–41]

CONCLUSION

Although research that has evaluated the effectiveness of the BFHI as an intervention to improve breastfeeding rates has been conducted, many of these studies have been hampered by weak designs or methodologic limitations. Research conducted in the United States and employing experimental designs would help to support the BFHI as an effective intervention for the improvement of breastfeeding rates.

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CONFLICTS OF INTEREST

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