

Breastfeeding interventions and programs conducted in the Islamic Republic of Iran: a scoping review

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Abstract

The purpose of this review was to identify interventions promoting breastfeeding (BF), BF practices and their outcomes in Iran. Using the PRISMA-ScR Guidelines, we searched across 14 databases for publications published between 2010 and February 2024 to identify studies published in English or Farsi language in peer-reviewed journals, using search terms 'breastfeeding', 'lactation', 'education', 'promotion', 'intervention' and 'program'. Inclusion criteria included intervention-based studies with quantitative outcomes of pregnant women/mothers receiving education, training or other intervention that promoted BF or exclusive BF. Excluded studies were protocols, those examining Iranian communities outside of Iran publications in other languages, brief communications, gray literature and qualitative studies. After screening for relevance, identified articles that met the inclusion criteria were summarized and tabulated using Rayyan QCRI software. Of the 45 identified studies, 37 used randomized-control trial designs, 20 applied theoretical frameworks or specific counseling techniques. Samples included women pregnant for the first time, mothers of babies born prematurely or with low-birth weight, adolescents, mothers who had very young children at home. Only three studies included family members. BF self-efficacy was the most popular variable to assess, which was examined in 32 studies. Almost all studies showed positive results as a result of intervention. Majority of studies were focused at the individual level. No studies were identified that assessed strategies to change routine care or policies that might facilitate BF. Identifying barriers to moving intervention content into standard of care is an important next step in the development of BF research in Iran.

Introduction

Breastfeeding (BF) is essential for both maternal and infant health. Breastmilk is an unadulterated source of antibodies that protects the newborn and provides complete nourishment in the first half year of life, and up to half of an infant's daily nutritional needs in the second half. Exclusive breastfeeding (EBF) (up to 6 months of age) can aid in reducing mortality due to

diarrhea and other infections among infants. The World Health Organization and UNICEF recommend, for EBF, that children initiate BF within the first hour after birth and be exclusively breastfed for the first 6 months of life. This means no other form of food or liquid including water should be given to the infant [1]. EBF can aid in reducing mortality due to diarrhea and other infections among infants. Despite recommendations by

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WHO, only about 44% of infants, 0–6 months old, are exclusively breastfed globally [2].

Rates of BF practices are lagging among lower-and middle-income countries [3]. In Iran, common BF challenges include inadequate milk supply, stress, early return to the workplace, difficulty latching, lack of awareness of appropriate BF techniques and exhaustion [4]. In Iran, EBF rates at 6 months of age at national level in 2016 averaged 53.1%, with 27.8% and 62.8% in urban and rural areas, respectively [5, 6].

Rates of EBF differ across the regions of Iran, which may be attributed to the influence of local customs, as well as demographic, psychosocial and biomedical factors [7–9]. Some cultural postpartum practices reported in a qualitative study by Iranian women were that while they believed BF to be a good practice for infants up to 4 months of age, they also did not breastfeed in public, and avoided BF during hot weather and when they were ‘angry’ [10]. Some women revealed that they fed their infants clay and mangosteen milk to eliminate jaundice. Lifestyle, employment status of mother, level of parental education, maternal age, advertisement of infant formula companies and recommendations for EBF by healthcare providers also had a significant effect on the practices of new mothers [6]. In Iran, identified predictors associated with adherence to BF recommendations include self-efficacy, attitude, social support, willingness, positive beliefs and intent toward initiating and continuing BF [11, 12]. The purpose of this review is to identify interventions promoting BF, BF practices and their outcomes in Iran.

Methods

Literature search

A scoping review of the literature was conducted using 14 databases, employing the PRISMA Extension for Scoping Reviews [13]. A combination of search terms and phrases related to BF interventions in Iran, that is, ‘breastfeeding’, ‘lactation’, ‘education’, ‘promotion’, ‘intervention’ and ‘program’ were used (Table I). The search strategy was adapted according to the indexing systems of each respective database. Furthermore,

reference lists from retrieved articles were manually reviewed to identify additional studies. All retrieved articles were screened against the eligibility criteria.

Eligibility criteria

The search was limited to intervention studies published in English or Farsi language in peer-reviewed journals between 2010 and February 2024 that involved BF in Iran. Inclusion criteria were quantitative and qualitative studies with samples of pregnant women/mothers receiving education or training promoting BF or EBF for a defined period of time, as either the primary intervention or as a component of a multibehavioural intervention at all levels (individual, programmatic, community, family or policy). Protocol studies were excluded, as were studies that examined Iranian communities, Iranian diaspora or migrants of Iranian origin residing outside of Iran, publications in other languages, brief communications, gray literature and interventions reported outside of traditional peer-reviewed articles (see Table II).

Study selection and data extraction

Reviewers 5 and 6 independently conducted the literature search and selected studies for inclusion in the scoping review. Differences were discussed to reach consensus and Reviewers 1, 2 and 3 resolved discrepancies if needed. Extraction and tabulation of data were done by Reviewers 1 and 4 and independently checked by Reviewers 5 and 6. Rayaan QCRI software [14] was used to assist in the screening process and study selection. Titles and abstracts were screened for relevancy, and potentially relevant journal abstracts were reviewed by Reviewers 1, 2 and 4. Potential studies for inclusion were evaluated independently by each author for relevance and inclusion/exclusion criteria (Table II). All selected articles were then discussed with the research team before final decision for inclusion (Fig. 1). Once the list of selected studied was finalized, Reviewers 1, 2 and 4 extracted and cross-checked the following for each study: author, date, target population, country, type of study, sample size, type, details of intervention, measured parameters, main results

Table I. Electronic databases used with relevant search period and terms

Databases	Search period	Keywords, search terms and phrases ^a
ArticleFirst; Biomed Central; BioOne; BIOSIS; CINAHL; EBSCOHost; ProQuest; PubMed; SAGE Reference Online; ScienceDirect; Scopus; SpringerLink; Taylor & Francis; and Wiley Online	2010 and February 2024	‘breastfeeding’; ‘lactation’; ‘education’; ‘promotion’; ‘intervention’; ‘Program’ [All Fields] AND ‘Iran’ [All Fields]

^aBased on the PRISMA Extension for Scoping Reviews [18], the same search strategy was employed in each of the databases listed, using all the keywords, search terms and phrases included above.

Table II. PICOS criteria for inclusion and exclusion of studies

Parameter	Inclusion criteria	Exclusion criteria
Date Range	Between 2010 and 29 February 2024	N/A
Population	<ul style="list-style-type: none"> • Pregnant woman/mothers residing in Iran • Healthcare providers in Iran • Health centers and hospitals in Iran 	<ul style="list-style-type: none"> • Iranian diaspora
Intervention type	Any type of education intervention that promotes BF or EBF, including: <ul style="list-style-type: none"> • Educational interventions. • Training intervention • Multicomponential interventions • Intervention promoted any level of influence, i.e. individual, programmatic, community, family or policy level 	<ul style="list-style-type: none"> • Interventions that are not delivered in Iran • Interventions that do not address BF nor EBF-related outcomes
Comparators	Pre-intervention, baseline BF and EBF related variables (knowledge, attitudes, practice, implementation of BF promoting programs) of studied groups who were: <ul style="list-style-type: none"> • Control: received no intervention. • Intervention: receive intervention(s) • Post- intervention • Intervention follow-up 	N/A
Outcomes of interest	<ul style="list-style-type: none"> • Changes in knowledge • Changes in attitudes • Changes in practice • Changes in self-efficacy • Change in BF rate • Change in EBF rate <ul style="list-style-type: none"> ◦ In: mothers, and in health care providers, health center and hospital practices and BF/EBF at discharge 	<ul style="list-style-type: none"> • Non-BF and non-EBF related outcomes
Language	English and/or Farsi	All other languages
Study type	Peer-reviewed original research articles Original research conference publications Experimental intervention studies with quantitative outcomes, at both population and community levels, as well as health care institutions	Nonpeer-reviewed articles Commentaries Study protocols Narratives Communications Non-intervention based studies White papers Gray literature Qualitative studies Non-numeric/categorical assessments or qualitative studies

Abbreviations:

BF: breastfeeding.

EBF: exclusive breastfeeding.

N/A: not applicable.

and main recommendations. Differences in opinion in data extracted were discussed to reach consensus and tabulated (see Supplementary Table). Given that methodological quality assessment is not a prerequisite for scoping reviews, we did not appraise the included studies [15].

Results

Forty-five studies were and published between 2010 and February 2024.

Designs

Thirty-seven of the studies used randomized-control trial designs [16–52]. Eight were described as having quasi-experimental designs [53–60].

Frameworks

Twenty studies used theoretical frameworks or specific counseling techniques. BASNEF (Beliefs, Attitudes, Subjective Norms and Enabling Factors) was the most frequently used model, found in five studies [18, 31, 42,

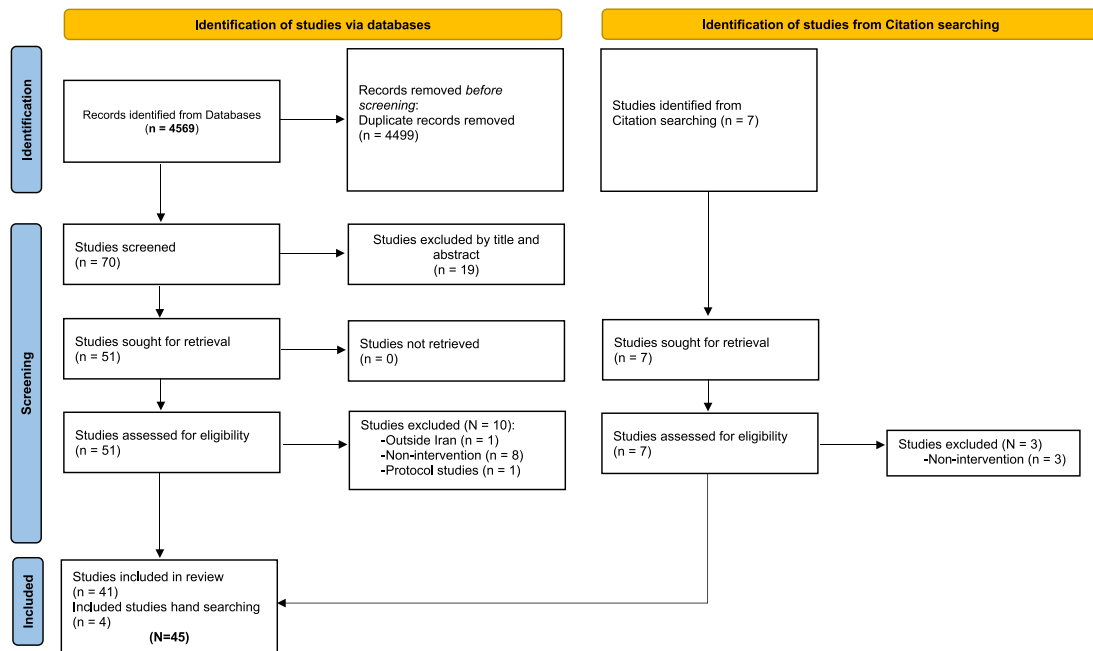


Fig. 1. Flow diagram.

44, 53], followed by Social Cognitive Theory used in four [19, 22, 35, 58], GATHER counseling techniques (Greet, Ask, Tell, Help, Explain, Return) were used in two [16, 23] and the Theory of Planned Behavior used in two [54, 60]. One study each used PRECEDE [27], the Health Belief Model [55], Motivational Interviewing [43], Self-Efficacy Theory [50], Stress Inoculation Training [38] and the US CDC's Communication Model [24].

Samples

Several studies concentrated on specific groups of women for their samples of BF intervention work. Eighteen studies focused on women pregnant for the first time or having just delivered their first child [16, 17, 19, 20, 22, 25, 27, 28, 32, 35–37, 40, 41, 50, 51, 55, 56]. Seven had as their sample mothers with premature or low-birth weight infants [18, 31, 33, 34, 39, 41, 57]; two additional studies focused on mothers with hospitalized neonates [42, 58]. One study focused on pregnant adolescents [23], one on mothers who were immediately postcaesarean section [30], one on mothers who had a history of unsuccessful BF [47] and one on mothers who had a first child at home who was <3 months old [46, 53]. Three studies included family members in their interventions: fathers [16], grandmothers [25] or influential relatives [60]. Sample sizes of the studies varied, ranging from a relatively underpowered N of 46 [21], to a robust N of 313 [26].

Interventions

In addition to education about BF-related topics, a variety of other techniques and intervention strategies were assessed. These included: couple-centered counseling [16], skin-to-skin contact [17], education plus acupuncture [53], stress management counseling [21, 48], peer support/education [22, 37, 42], inclusion of maternal grandmothers [25], inclusion of key family members [29], distance education [26], ketani breast massage [30], message framing [56], continuous supportive telephone counseling [34], auriculotherapy [41], baby massage training [58], motivational interviewing [43], role playing [44], group counselling [50] and home-based education [52]. There were also several mHealth applications, including work with a social network group [24], telemidwifery counseling [35] and mobile-based EBF education [45, 46, 58, 59].

Assessment variables

BF self-efficacy was the most popular variable to assess, being present as the primary or secondary outcome in 31 studies [16, 17, 19–23, 25, 29, 30, 32–38, 40, 42–48, 50, 52, 55, 56, 58, 59]. EBF was assessed in nine studies [19, 20, 22, 28, 29, 31, 40, 44, 52]. Perceived maternal stress or anxiety as an outcome variable was assessed in six studies [21, 33, 38, 41, 48, 58] and one had an outcome of maternal mental health [49]. BF knowledge, attitudes and practices were outcomes measured in seven studies [26, 27, 31, 46, 51, 54,

55]. General BF behaviors were assessed by four study teams [17, 23, 30, 51]. BF problems were addressed in three studies [20, 28, 47]. Only six studies considered pediatric outcomes in the form of infant growth or developmental indicators [18, 31, 39, 53, 55, 57].

Outcomes

Only 1 of the 45 studies had nonsignificant differences between their intervention and control groups [37]; this study compared the effect of support from trained peers with that offered by health providers. The findings for this peer intervention are in contrast with two studies in the review which found positive differences with peer support interventions [25, 45].

Discussion

The identification of 45 articles published in the past 14 years indicates a robust research literature assessing BF interventions in Iran. The populations of BF mothers were diverse, and included mothers of infants born prematurely, with low-birth weight or hospitalized for whatever reason, all groups in need of extra support and special instructions to be able to successfully breastfeed. Nine articles focused on interventions to support these populations in Iran [18, 31, 33, 34, 39, 41, 42, 57, 58]. Other populations in need of special support to successfully breastfeed include adolescents, mothers who have had caesarean sections, and those with a history of unsuccessful BF. Iranian researchers implemented interventions to address each of these [23, 30, 47]. No interventions were identified which focused on the special populations of mothers of babies with cleft lip, cleft palate or cleft lip and palate. While a recent review found that while the overall prevalence of cleft lip and cleft palate is lower in Iran compared to other countries in the Middle East and Asia, prevalence varies in different regions of Iran [61].

All the studies yielded positive results, many with outcomes of widely documented precursors of successful BF and EBF such as self-efficacy, knowledge and attitudes [62, 63].

Most importantly, these are also proximal variables to infant growth, development and health, which are the critical reasons in support of EBF. Assessment of infant outcomes would strengthen the evidence and educational messages for women to continue BF and EBF for the recommended first 6 months of their baby's life.

The majority of the interventions were focused at the level of the individual mother, with only a few focusing on partner, family or peer involvement, despite strong evidence that such strategies have been successful in other countries [64–69]. There were relatively

few interventions that used any mHealth or technology-related components [70]. No research used community health workers, despite women's documented needs for BF support throughout the postpartum period.

Two additional areas that received no research attention from researchers in Iran are institutional and policy barriers to BF. For example, the randomized clinical trials identified in this review all used routine care, either provided by staff from community health centers or from postpartum or neonatal units. Largely ignored were questions about what it would take to change routine care instruction about BF at these clinical sites, or to integrate positive findings into standard of care.

Iran was an early adopter of the Baby Friendly Hospital designation and 90% of hospitals have received this accreditation [71, 72]. However, an older report found gaps in the implementation of the 10 steps expected in the hospitals, notably 'Step 4—help mothers initiate breastfeeding within a half hour of birth', and 'Step 6—give newborn infants no food or drink other than breast milk, unless medically indicated.' In one study with 700 postpartum women in Shiraz, the lack of these two hospital-based practices was associated with women less likely to have full or any BF [5]. Such practices are largely staff dependent and an integral part of the definition of exclusive breastfeeding [1]. While staff shortages and workloads may be responsible for these gaps, research, perhaps with methods such as implementation science to accurately identify the causes for the minimal uptake of this research-based practice, would be an important contribution to the health of infants [73].

Minimal attention was paid to possible cultural or policy interventions to reinforce or counter cultural beliefs that influence BF practices. For example, in one small qualitative study about the beliefs of postpartum women in Iran, specifically mentioned was giving animal butter to the baby to eliminate meconium, and clay, mangosteen milk or herbal remedies for babies with jaundice [10]. In another study about weaning beliefs, the authors identified the role of false cultural beliefs about weaning among the majority of women [74]. Finally, while the number of Iranian women in the workforce is only around 30% [75], these employed women are entitled to nine months of paid maternity leave [76]. No assessment was identified on the impact of this policy on BF practices or rates.

Strengths of this study are a comprehensive review of BF work conducted by researchers in Iran. Limitations include the reality that majority of the articles were conducted at the level of the individual woman, largely ignoring the family and social context in which BF occurs. It is also possible that unpublished hospital and clinic-level quality improvement projects and those found in the gray literature would provide a broader

context and additional material for supporting BF in Iran.

Conclusion

Changing national breastfeeding rates necessitates interventions on multiple levels. As the authors of the recent Lancet review suggest, 'Breastfeeding is not the sole responsibility of women and requires collective societal approaches' [77]. While research identified in this article identify multiple studies done on the individual level, future research assessing family, community and policy interventions can contribute to improving rates of BF and infant health outcomes. Identifying barriers to moving intervention content into standard of care is also an important next step in the development of BF research in Iran.

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Author contributions

Patricia J. Kelly (Designing and conducting the research, Drafting the manuscript, Analysis of data, primary responsibility for final content), Amrita Sidhu (Designing and conducting the research, Drafting the manuscript), Anusha Sajja (Designing and conducting the research, Drafting the manuscript), Devan-shi Majeethia (Designing and conducting the research, Drafting the manuscript), Elizabeth Dodge (Designing and conducting the research, Drafting the manuscript), and Basil H. Aboul-Enein (Designing and conducting the research, Drafting the manuscript, primary responsibility for final content). All authors read and approved the final manuscript.

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Conflict of interest

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