Interventions and programs to promote breastfeeding in Arabic-speaking countries: A scoping review

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Abstract

Introduction: Low prevalence of exclusive breastfeeding in the Arab world is concerning and suboptimal breastfeeding is a leading child health risk factor in several Arab States. Breastfeeding education has the capacity to improve breastfeeding knowledge and practice, thus positively impacting infant and maternal health. The purpose of this review is to identify and examine the impact of breastfeeding promotion interventions across the Arab world.
Method: A scoping review of the literature was conducted across seventeen databases for relevant publications published through October 2021 to find studies in Arab countries, that involved breastfeeding as an intervention component. Twenty-one articles met inclusion criteria and were reviewed.
Results: Individual and community based educational interventions offer the opportunity to positively impact the knowledge, attitudes, and practices of breastfeeding in new mothers in Arab countries. Increased breastfeeding has the potential to lead to improved neonate and maternal health. In addition to significant benefits found across individual and community-based interventions in a variety of Arab countries, there is also evidence that interventions that improve the knowledge of health care professionals and/or the practices of a health care system can contribute to subsequent increases in breastfeeding rates.
Discussion: Breastfeeding education is a low-cost and high-impact public health tool that can impact infant and maternal health and potentially increase breastfeeding adherence in the Arab world.

Keywords

Breastfeeding; lactation; maternal-child health; Middle East; North Africa

Significance

What is already known on this subject?

Breastfeeding has major long-term effects on the health and development of children as well as women's health. Combined health systems and community interventions more than double exclusive breastfeeding rates globally. The most cost-effective ways to promote exclusive breastfeeding include counselling and supportive interventions in multiple settings.

What this study adds?

Multi-component educational and supportive interventions increase breastfeeding initiation and duration among mothers in the Arab world. The most successful interventions among Arab women include education as well as pre- and post-partum support. Education and training for health professionals on the importance of breastfeeding can have broad-reaching impact on improving breastfeeding rates.

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Acknowledgements None.

Author Contributions BAE: Conceptualization, methodology, data curation, writing original draft, writing review and editing, supervision. ED: Methodology, analysis, writing review and editing, supervision. NB: writing original draft, methodology, writing review and editing RM: writing original draft, methodology, writing review and editing.

Funding The authors received no financial support for the research, authorship, and/or publication of this article

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval Given the nature of this scoping review, no ethical oversight was found to be necessary and, therefore, no institutional review board was acquired.

Consent to Participate Not applicable.

Consent to Publication Not applicable.

Availability of data and material supplementary material to Table 3.

Code availability Not applicable.

Abstract

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Introduction

Exclusive breastfeeding, including initiation within one hour of life, breastmilk only during the first 6 months of life, and continued breastfeeding for up to 2 years of age with the inclusion of semi-solid and solid food and water after 6-months, is considered the most cost-effective neonatal health intervention with the largest impact on child mortality which does not require extensive health infrastructure (Fewtrell, Mohd Shukri, & Wells, 2020). Unfortunately, only 2 of 3 infants are exclusively breastfed globally (World Health Organization & UNICEF, 2014).

A growing body of evidence demonstrates that breastfeeding has major long-term effects on the health and development of children, as well as women's health (Victora et al., 2016). Breast milk contains all the necessary nutrients for an infant's first 6 months of life, provides immunity to disease through maternal antibodies, increases intelligence and likely reduces overweight and diabetes (Horta, 2019; Victora et al., 2016). For women, breastfeeding protects against breast cancer, improves bone health, helps to manage birth spacing, and may protect against ovarian cancer and type 2 diabetes (Binns, Lee, & Low, 2016; Chowdhury et al., 2015; Grizzo et al., 2020; Kim, Kim, Kim, & Shin, 2019; Rollins et al., 2016; Victora et al., 2016; Walters, Phan, & Mathisen, 2019; Wiklund et al., 2012). Globally, if all infants were breastfed it could save nearly 850,000 lives by averting an estimated 823,000 child deaths and 20,000 maternal deaths due to breast cancer (Victora et al., 2016).

The UNICEF and WHO global target for 2025 is least 50% of infants be exclusively breastfed for the first six months of life (World Health Organization & UNICEF, 2014). Almost all mothers can successfully breastfeed, however, in many societies it is no longer a norm (Garrett, Azimov, Campwala, Sarmiento, & Linton, 2018). Creating a conducive environment is critical to improve breastfeeding practices (Azad et al., 2021). A Lancet systematic review demonstrated

that combined health systems and community interventions more than doubled exclusive breastfeeding rates (Rollins et al., 2016). Another systematic review exploring interventions in five settings (health systems, home, community, employment, policy environment or a combination of any of them) concluded that some of the most cost-effective ways to promote exclusive breastfeeding include counseling and supportive interventions in multiple settings (Sinha et al., 2015). Similarly, WHO/UNICEF recommend support at the health facility and community levels, limiting aggressive marketing of breast milk substitutes, enacting mandatory paid maternity leave and investing in building capacity to protect, promote and support breastfeeding (World Health Organization & UNICEF, 2014). Utilizing existing human rights instruments including right to health, right to food, and child rights are crucial supports to protect the best interests of the child and mother, including protecting breastfeeding as a human right (Grummer- Strawn et al., 2017).

Low prevalence of exclusive breastfeeding in the Arab world is concerning; some countries in the Arab world approach the global average but prevalence is much lower in others including in Somalia (5.3%) and Tunisia (8.1%) (Al-Jawaldeh, Abul-Fadl, & Tawfik, 2018; United Nations Office of the High Commissioner for Human Rights, 2016). A comprehensive analysis reported that suboptimal BF was identified as a leading child health risk factor in several Arab States including Algeria, Egypt, Iraq, Libya and Morocco (Roberts, Carnahan, & Gakidou, 2013). Several initiatives have been conducted to improve breastfeeding practices in the Arab World. For example, the WHO/UNICEF Baby Friendly Hospital Initiative is improving breastfeeding adherence in Bahrain, Iraq, Oman, Saudi Arabia, Tunisia and the United Arab Emirates (Al-Jawaldeh & Abul-Fadl, 2018). Seventeen countries have enacted legislation to protect breastfeeding in line with the International Code of Marketing of Breastmilk Substitutes (Al

Jawaldeh & Sayed, 2018). These initiatives, as well as other more programmatic interventions, face challenges in implementation including limited political commitment, limited capacity of health professionals, and weak societal support for breastfeeding despite Islamic teachings supportive of breastfeeding for two years to ensure child health (Abul-Fadl, Farghaly, Alsumaie, Bozo, & Al-Jawaldeh, 2021; Al Jawaldeh & Sayed, 2018; Bensaid, 2021; World Health Organization - Regional Office for the Eastern Mediterranean, Alwan, McColl, & Al-Jawaldeh, 2017). Thus, the aim of this scoping review is to identify and examine the impact of breastfeeding promotion interventions across the Arab world.

Methods

Literature search

A scoping review of the literature was conducted using 17 databases, employing the PRISMA Extension for Scoping Reviews (Tricco et al., 2018), that were selected due to their medical and biomedical scope and rigor and a combination of search terms and phrases related to exclusive breastfeeding and the respective countries (Table 1). For the purpose of this review, Arabic-speaking countries were defined as the 22-member countries of the League of Arab States (Blair, Grivna, & Sharif, 2014; League of Arab States., 2021). Additionally, reference lists from retrieved articles were hand reviewed to identify additional relevant publications. All retrieved articles were screened against eligibility criteria, relevance to the topic and the objective of this review.

Eligibility Criteria

The search was limited to studies published in the English, French, and Arabic languages in peer-reviewed journals. The search was conducted in the Fall of 2021 and the results communicate literature published through October 31st, 2021. Only intervention-focused articles that involved the promotion of either any breastfeeding or exclusive breastfeeding for a defined period of time as either the primary intervention or as a component of a multi-behavioural intervention at all levels (individual, programmatic, community, family or policy) were included. Protocol studies were also included. Studies that examined Arabic-speaking communities or migrants of Arab origin residing in non-Arabic–speaking countries were excluded. Publications in other languages, brief communications, grey literature, qualitative studies, and interventions reported outside of traditional peer-reviewed articles were excluded (Table 2).

Study selection and data extraction

BAE and NB independently conducted the literature search and selected studies for inclusion in the scoping review. Differences were discussed to reach consensus; ED resolved discrepancies if needed. Extraction and tabulation of data was done by NB and independently checked by BAE and EAC. The search strategy was adapted according to the indexing systems of each respective database. Rayyan QCRI software (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016; Rayyan., 2021) 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 3 of the authors (ED, NB, and BAE). Potential studies for inclusion in this review were evaluated independently by each author for relevance, merit, and inclusion/exclusion criteria (Table 2). All selected articles were then discussed with the primary author before final decision for inclusion (Figure 1). Once the list of selected studied was finalized, BAE extracted and NB

and ED 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, and main recommendations. Differences in opinion in data extracted were discussed to reach consensus and tabulated (Table 3).

Results

These 21 breastfeeding promotion interventions across 11 Arab countries (five from Jordan, four from Egypt, two each from Lebanon, Morocco, and Saudi Arabia and one each from Iraq, Somalia, Syria, Tunisia, United Arab Emirates and Yemen) reported positive changes in knowledge, attitudes, and/or practice of breastfeeding (Table 3). Eighteen studies were health facility based with only three involving broader engagement at the community level. A majority of the interventions focused at the individual level (N=14); most of these targeted pregnant women (N=5) or mothers who just delivered (N=8) and one targeting interns (Mostafa, et al, 2019). Four took place in one or more health facilities; three targeted health professionals (AL-Nuaimi, Ali, & Ali, 2019; Amsalu et al., 2020; Chaouachi et al., 2011) and one was a multi-component Baby-Friendly Hospital Initiative (BFHI) including hospital policies, building health care staff capacities and patient education (Clermont et al., 2021). Sample sizes ranged from 36 pregnant women to over 1000 community population.

The types of interventions varied from a brief post-natal educational session (Abuidhail, Odeh, Ibrewish, Alqam, & Alajrab, 2017) to an extensive 6-month intervention involving antenatal education, on-going professional and peer support (Nabulsi et al., 2019). Eighteen interventions included a component on patient education; another seven that included capacity building of health care workers and four included support by a health care worker including follow-up home

visits. Two studies involved policies largely at the health institution level (Al Ghazal, Rashid, & Ruf, 2015; Clermont et al., 2021). Three studies reported on family support (Alnasser et al., 2018; Hanafi, Hamid Shalaby, Falatah, & El-Ammari, 2014; Mostafa, Salem, & Badr, 2019) and one that involved peer support (Nabulsi et al., 2019). No interventions examined broader public health policy interventions limiting aggressive marketing of breast milk substitutes or maternity leave. The follow-up period ranged from immediately post-intervention (Alnasser et al., 2018), 2018) to up to 2-years following a community campaign (Al Ghazal et al., 2015).

More than half the interventions (N=16) included breastfeeding practice as a primary outcome with 12 aiming for 6-months exclusive breastfeeding. Five had breastfeeding initiation as a primary outcome; only one breastfeeding for longer than 12 months (Chaouachi et al., 2011) and another one reported on breastfeeding (Youssef, Saker, Mourad, & Mohamed, 1993). The remaining interventions focused largely on breastfeeding knowledge and attitudes by mothers, health professionals or interns.

Outcome: Exclusive breastfeeding

Two of the three randomized control trials (RCT) identified in this review had exclusive breastfeeding at six months as a primary outcome (Bashour et al., 2008; Khresheh, Suhaimat, Jalamdeh, & Barclay, 2011). A multi-component intervention (prenatal breastfeeding education and postnatal professional lactation and peer support for six months) in Morocco reported that exclusive breastfeeding at 6 months was significantly higher in the intervention group compared to the control group for mothers living in Rabat (54%; 38.8 %, P = 0.011), Midelt (58%; 40%, P = 0.013) and Khenifra (60.6%; 48.5 %, P = 0.001) (Laamiri et al., 2019). However, a multicomponent programme (a one-to-one postnatal educational session and follow-up phone

calls at two and four months postpartum) in Jordan reported no significant difference in exclusive breastfeeding rates at six months between the intervention and control groups despite significant improvements in knowledge of breastfeeding (Khresheh et al., 2011).

Five additional studies reported positive outcomes for six months exclusive breastfeeding. A multicomponent intervention (prenatal breastfeeding education, professional, and peer support programme) in Lebanon reported women in the intervention group were twice as likely to exclusively breastfeed compared to the control group in multivariate analysis (OR = 2.02; 95% CI: 1.20 to 3.39; P=0.008) (Nabulsi et al., 2019). A post-natal breastfeeding educational session in Morocco resulted a significantly higher percentage of mothers in the intervention group exclusively breastfeeding their infants at six months compared to the control group, 55.2%; 38.8% respectively; P = 0.002 (Bennis et al., 2017). A health-centre based training programme for health professionals in Tunisia showed a significantly higher rate of exclusive breastfeeding at six months for women attending the intervention group health center compared to the control group: 11.0%, 4.3% respectively, P=0.0001 (Chaouachi et al., 2011). A multi-component breastfeeding campaign targeting health facilities, workplaces, nurseries and public places in the United Arab Emirates reported that the exclusive breastfeeding rate in the community doubled from 18.1% prior to the campaign to 39.9% afterwards (Al Ghazal et al., 2015). The Yemen cash for nutrition programme reported that the probability of women exclusively breastfeeding their infants for 6 months increased by 14.4% points (Kurdi, Figueroa, & Ibrahim, 2020).

Four pre and post-natal educational interventions aimed for exclusive breastfeeding for durations varying from after completion of two 30 minute sessions to 4 months reported positive results. A multicomponent post-natal educational programme (breastfeeding promotion and home visits) in

Syria reported a significantly higher proportion of infants being exclusively breastfed at four months: 28.5% (4 home visits) and 30.0% (1 home) compared to 20% in the group with no home visits (P=0.023) (Bashour et al., 2008). A five-session educational programme of Egyptian mothers of preterm babies resulted in a significant increase in exclusive breastfeeding at three months: intervention group: 40%, control group: 13%, P<0.001 (Ahmed, 2008). A health centre based post-natal educational programme on neonatal care in Egypt reported significant improvement in exclusive breastfeeding following the completion of two 30 minutes educational sessions: 95.1% of participants exclusively breastfed compared to only 40.7% at recruitment; P=<0.001 (Baih, 2020). A Jordanian childbirth preparation programme that involved 12 sessions over six months reported that 88.9% of the 32 participants exclusive breastfed at two months much higher than the national rates of 22.7% (Khresheh, Almalik, Owies, & Barclay, 2018). The BFHI initiative in Lebanon reported that the rate of exclusive breastfeeding of neonates prior to discharge increased significantly following two years of implementation: before: 3.3%, after: 42.4%; P = 0.006) (Clermont et al., 2021).

Outcome: Other breastfeeding practices

Three interventions, a post-natal educational programme, introduction of a newborn care package in health institutions and a community campaign, reported positive results related to breastfeeding of neonates. A quasi-experimental pre-post breastfeeding education intervention about proper breastfeeding positioning in post-natal women (N=216) found that those in the intervention group were significantly more skilled (p=0.004), based on the LATCH score than were the mothers in the control group (Abuidhail et al., 2017). Implementation of a newborn care package in four health centers in Somalia that included training health workers and provision of

delivery and newborn kits while early initiation of breastfeeding increased from 30.1 to 83.7% with an adjusted odds ratio 10.6 (95% Confidence Interval: 10.6; P< 0.014) (Amsalu et al., 2020). A year-long intervention that involved a 2-day seminar for health care workers combined with two 3-month long mass media campaigns in Jordan reported an increase in breastfeeding initiation within 6 hours of infant's birth: 39.9% before the seminar to 54.3% following the media campaigns(McDivitt, Zimicki, Hornik, & Abulaban, 1993).

Outcome: Knowledge and attitudes

Although most studies included raising awareness and/or changing attitudes towards breastfeeding, only five studies reported on interventions limited their focused on these two areas. Two educational interventions targeted expectant mothers; one involve a 2-session educational programme with the provision of a breastfeeding booklet in Iraq reported a significant improvement in knowledge and change in attitude about breastfeeding among participants compared to the control group (P<0.001) (Piro & Ahmed, 2020) and another was delivered via mHealth in Saudi Arabia and reported an increase in intention to exclusively breastfeeding: 80.8% compared to 46.1% pre-intervention (46.1%) (Alnasser et al., 2018).

A 4-hour training programme over two sessions covering all components of the BFHI reported significant improvements in knowledge and attitudes 3 months after the intervention of interns in Egypt (P<0.001) (Mostafa et al., 2019); another training programme for nurses and midwives in Jordan reported significant improvements in knowledge, attitudes and clinical practice (AL-Nuaimi et al., 2019).

Discussion

The articles included in this scoping review are in alignment with previous findings of the benefits of individual, community, health center and hospital-based education initiatives and trainings (Sinha et al., 2015; Victora et al., 2016; World Health Organization & UNICEF, 2014). These interventions demonstrated positive impact on maternal breastfeeding knowledge, attitudes, and practices such as breastfeeding initiation, exclusive breastfeeding and breastfeeding duration, as well as health professional knowledge and support of breastfeeding mothers. Increasing maternal knowledge and breastfeeding practice in the Arab world, can be realized through appropriate education and training in individual, community, and health care settings. These include increased early initiation of breastfeeding, increased breastfeeding and exclusive breastfeeding rates, and increased duration of breastfeeding.

Numerous studies demonstrated how multiple component breastfeeding interventions can create a supportive environment (Al Ghazal et al., 2015; Clermont et al., 2021; Khresheh et al., 2011; Nabulsi et al., 2019). Training health professionals, and patient education combined with the implementation of policy and practice initiatives to encourage breastfeeding during pre-natal care, post-partum, and after discharge at follow-up care visits is critical. In fact, since health center and hospital based breastfeeding education initiatives have the ability to impact a large number of women and their children, they may be amongst the most cost-effective interventions (Sinha et al., 2015) to increase breastfeeding knowledge and practice in Arab countries. The WHO-UNICEF Baby Friendly Hospital Initiative is an excellent multicomponent example that has positive impact on short-term, medium-term and longer-term breastfeeding outcomes

globally and should be part of a comprehensive approach to promoting breast-feeding in a country (Al-Jawaldeh & Abul-Fadl, 2018; Pérez-Escamilla, Martinez, & Segura-Pérez, 2016).

Successful interventions included in this review provided mothers' education plus pre- and post-partum support for the mother by health professionals (AL-Nuaimi et al., 2019; Alnasser et al., 2018; Amsalu et al., 2020; Baih, 2020; Hanafi et al., 2014; McDivitt et al., 1993; Mostafa et al., 2019; Youssef et al., 1993). Post-partum support is a key way of encouraging mothers, especially new mothers, to exclusively breastfeed helps build their confidence in their ability to produce sufficient milk for their infants (Rollins et al., 2016). Multi-component interventions that provide post-partum support through professional lactation management as well as through peer support can ensure sustainability of this important practice (Al-Jawaldeh & Abul-Fadl, 2018; Rollins et al., 2016). Family support for women who are breastfeeding is an important issue identified by several studies in the region (Al-Ghannami et al., 2022; Al Ketbi et al., 2018; Radwan & Sapsford, 2016); more operational research that incorporates their engagement in breastfeeding promotion is needed.

This review found that the primary outcome for 18 of the 21 studies included exclusive breastfeeding, however, the duration of the reported interventions were too short for nearly half of them to examine the intervention's impact for exclusive breastfeeding for 6 months let alone continued breastfeeding past 12 months. Although four of these interventions targeted pregnant women, only one reported on initiation of breastfeeding a critical factor for neonatal health (REF). Longer duration intervention research promoting early initiation and 6-month exclusive breastfeeding is needed to guide public health action for the region to move closer to the global

target of at least 50% of infants being exclusively breastfeed for six months (World Health Organization & UNICEF, 2014).

A major gap in the scoping review was the lack of policy related research. The multicomponent community-based study in the United Arab Emirates (Al Ghazal et al., 2015) was the only study that engaged the non-health sectors in creating a conducive supportive environment for breastfeeding women. The ubiquitous marketing of breast milk substitutes and short maternity leaves are two key barriers to exclusive breastfeeding in the Arab world which national policies could address (Al-Ghannami et al., 2022; Al Jawaldeh & Sayed, 2018; Al Ketbi et al., 2018; Alnasser et al., 2018; Nasser et al., 2018; Radwan & Sapsford, 2016). Policy relevant research addressing the aggressive marketing of breast milk substitutes and paid maternity leave that meet the International Labor Organization's 14-week minimal standard in the region would develop context specific evidence that would guide public health action (Ahmed & Fielding, 2019).

Although this review identified a breadth of educational interventions to promote breastfeeding, only one used mHealth as the educational platform (Alnasser et al., 2018). A recent systematic review on mHealth technologies in the Arab world observed that health systems are slow to incorporate mHealth technologies as part of health care delivery due to different social, demographic and political factors (Alsswey, Al-Samarraie, & Bervell, 2021). Digital technologies and social media reached unprecedented scale during the COVID-19 pandemic and supported access to health care delivery, expanding public health informatics, promoting prevention and increasing community engagement in the region (Elden et al., 2022). Their usage, and mHealth in particular, could transform health systems especially when technological and

regulatory challenges are addressed (Alsswey et al., 2021; Elden et al., 2022). Global evidence shows that mHealth interventions significantly improves exclusive breastfeeding (Alnasser et al., 2018; Qian et al., 2021). Given the widespread use of mobile phone, further intervention research on using mHealth to promote exclusive breastfeeding in the region is needed to determine how best they can be used to promote breastfeeding.

All interventions included in this scoping review reported positive changes in knowledge, attitudes and/or practice. This positive bias may be due in part to the short duration of a majority of the studies; longer duration for follow-up is needed to explore if the changed behaviour was sustained. As a scoping review, we did not use study quality as an inclusion criterion nor conduct a quality assessment which limited the comparability between studies and identification of best practices for breast feeding interventions in the Arab world. This scoping review was limited to published articles, it is possible that additional intervention studies are available in the grey literature.

Conclusion

Education of mothers and health care professionals in the Arab world can increase breastfeeding knowledge, attitudes and practices including early initiation of breastfeeding, breastfeeding incidence, exclusive breastfeeding, and breastfeeding duration. Breastfeeding education is a low-cost and high-impact public health tool that can impact infant and maternal health. Although breastfeeding education is effective in individual, community and health care settings, larger-scale initiatives such as the Baby-Friendly Hospital Initiatives that includes trainings and education programs offered to health care professionals in combination with supportive

programming and policies in the health care setting may offer the best way to maximize the positive impacts of breastfeeding education interventions. Education programs that include a maternal support component may be the most effective at increasing breastfeeding adherence and duration in mothers in Arab countries.

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Figure 1. Flow diagram

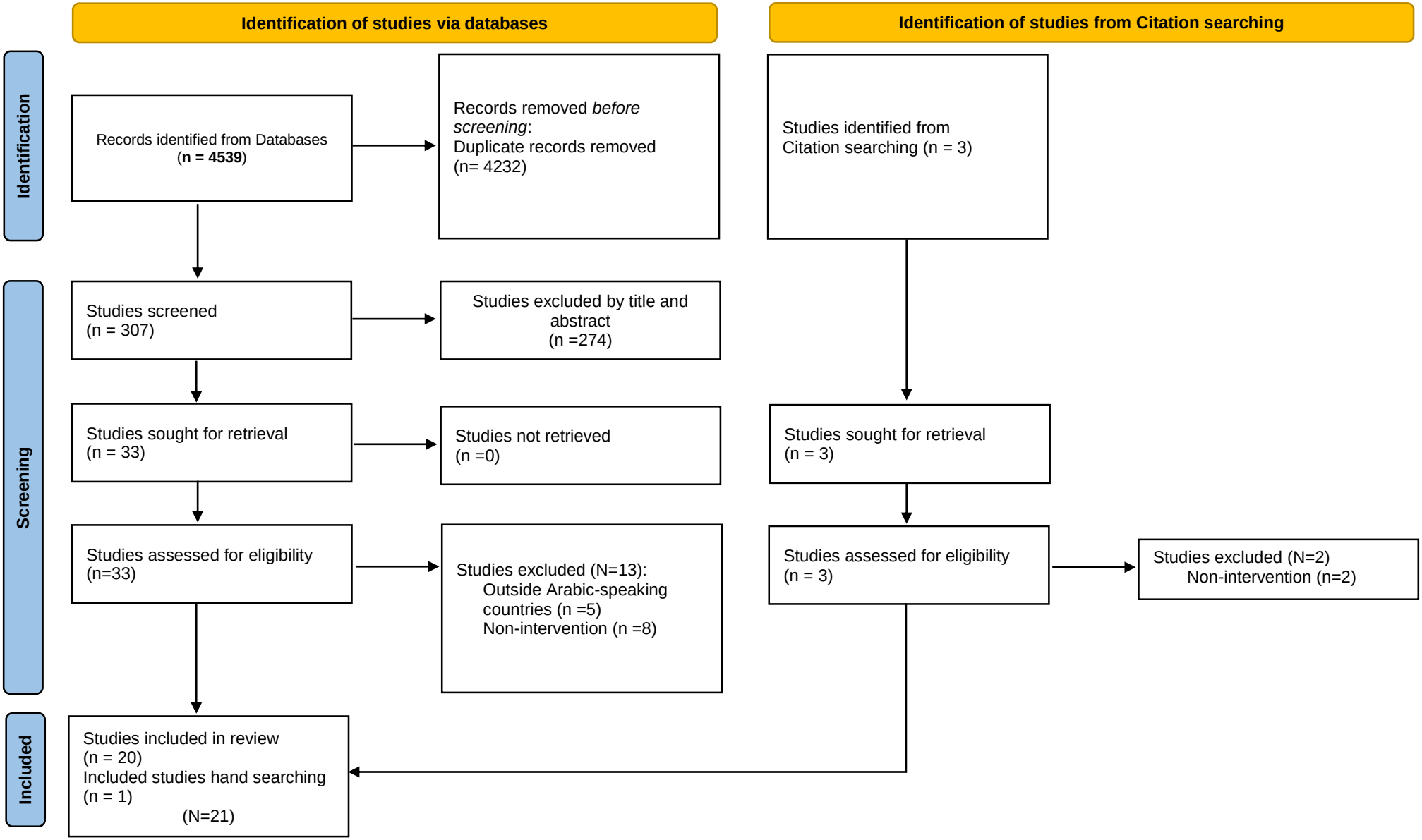

Table 1

Table 1. Electronic Databases Used with Relevant Search Period and Terms

Databases	Search Period	keywords, search terms, and phrases
Cochrane Database; ArticleFirst; Biomed Central; BioOne; BIOSIS; CINAHL; EBSCOHost; JSTOR; ProQuest; PubMed; SAGE Reference Online; Index Medicus for the Eastern Mediterranean Region, ScienceDirect; Scopus; SpringerLink; Taylor & Francis; and Wiley Online	Up to October 31st, 2021	"breastfeeding"; "lactation"; "education"; "promotion"; "intervention"; "Program" AND "Algeria"; "Egypt"; "Bahrain"; "Comoros"; "Djibouti"; "Iraq"; "Jordan"; "Saudi Arabia"; "Kuwait"; "Lebanon"; "Libya"; "Mauritania"; "Morocco"; "Oman"; "Palestinian Territories"; "Qatar"; "Yemen"; "Somalia"; "Sudan"; "Syria"; "Tunisia"; "the United Arab Emirates."

Table 2. PICOS Criteria for inclusion and exclusion of studies

Parameter	Inclusion Criteria	Exclusion Criteria
Population	• Arab pregnant woman/mother • Healthcare providers • Health centers and hospitals	• Arab mother resident in non-Arab countries
Intervention type	Any type of education intervention that promotes BF or EBF, including: • Educational interventions. • Training intervention • Multi-componential interventions • Intervention promoted any level of influence i.e. individual, programmatic, community, family or policy level	• Interventions that are not delivered in Arab countries • 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: • Control: received no intervention. • Intervention: receive intervention(s) • Post- intervention • Intervention follow-up	• N/A
Outcomes of interest	• Changes in knowledge • Changes in attitudes • Changes in practice • Change in BF rate • Change in EBF rate o In: Mothers, and in health care providers, health center, and hospital practices and BF/EBF at discharge	• Non-BF and non-EBF related outcomes
Language	English, Arabic, French	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	Non-Peer-reviewed articles Commentaires Narratives Communications Non-intervention based studies White papers Systematic, scoping, o narrative reviews Grey literature Qualitative studies Non-numeric/categorical assessments or qualitative studies

Abbreviations:
BF: Breastfeeding
EBF: Exclusive Breastfeeding
N/A: Not applicable

Table 3

Table 3. Summary of literature search (n=21)

Authors (Year)	Target Population/ Country	Type of Study	Sample Size	Type and details Intervention	Measured Parameters	Main Results	Main Recommendations
Primary outcome: Exclusive breastfeeding							
Individual level							
Ahmed, 2008	Mothers and their preterm infants (born <37 weeks of gestation) Cairo, Egypt	Experimental design	N= 60	Five-session educational BF program during hospitalization and after discharge. Follow up: 3 months after discharge.	1: Knowledge of mothers related to BF 2: BF practices by mothers 3: BF diary	Knowledge related to BF increased significantly in IG ($p = 0.041$), but not in CG BF practices improved progressively in the IG 3:80% of IG were discharged on EBF, versus 40% among the CG	A.) Support and motivation should be provided to Mothers of preterm infants immediately after birth by health professionals with BF knowledge. B.) Individual teaching methods, the use of developmental BF and follow up are effective in promoting BF.
Baih, 2020	Postnatal primipara mothers and their live newborns Cairo, Egypt	Pre- and post-intervention study	N=162	Nursing multicomponent intervention, including BF Follow-up at 4 weeks	Knowledge and practice of mothers regarding BF	There was an increase in maternal satisfaction pre- and post- intervention ($p<0.05$), as follows: Pre-lactal feeding from 64.3% to 71% Colostrum feeding 56.2% to 81.5% EBF from 40.7% to 95.1% BF practice from 24% to 69.1%.	The implementation of nursing intervention sessions positively impacted hew mothers' home care, as they reported increased satisfaction in BF practices. Intervention classes for new mothers is recommended and should be included on as systematic basis.
Bashour et al., 2008	New mothers Damascus, Syria	Randomized controlled trial	N= 876 IG (A): n=285, 4 visits	Multicomponent education program, including BF, delivered through	Proportion of new mothers who practiced of EBF.	The proportion of new mothers in IG A and B who exclusively breastfed their infants (28.5% and 30%,	Home visits after delivery lead to increase of EBF.

			IG (B), n= 294, 1 visit CG: n= 297, No visit.	postnatal home visits. Follow-up at 4-months post-partum	Follow-up after 4 months	respectively) was increased compared with Group C (20%).	Other innovative methods are recommended to improve postnatal care in Syria.
Bennis et al., 2017	Pregnant women Rabat, Morocco	Prospective cohort study	IG: n=372 CG: n=178	Educational sessions about benefits and management of BF (oral and written information) Six months follow-up through telephone	EB rates	55.2% of IG exclusively breastfed their babies up to the age of six months compared to 38.8% in CG (p = 0.002).	This strategy is effective in promoting EBF up to six months. Development of an intervention program for health professionals to promote BF through pre- and post- natal education of mothers.
Khresheh et al., 2018	Primigravid women Amman, Jordan	Exploratory, descriptive design and action research approach	N= 36	A CBPP composed of many topics provided over a period of 6 months (2^{nd} and 3^{rd} trimester), one focused on BF Follow-up after 2 months	The practice of EBF	The CBPP helped reinforced the practices of breastfeeding as about 89% of mothers maintained EFB until 2 months.	The success and effectiveness of the new CBPP is confirmed. The CBPP could be considered by Jordanian MOH to be implemented in different regions of the country.
Khresheh et al., 2011	Primiparous women (given birth to a healthy, full term, singleton baby) Southern Region, Jordan	Randomized controlled trial	N = 90 IG: n= 45 CG: n=45	IG: one-on-one postnatal educational session Follow-up phone calls at 2 and 4 months postpartum, CG: routine postnatal care.	Proportion of women who practiced EBF for six-months Knowledge of mothers related to BF at six months postpartum.	Significant increase in knowledge and practice related to BF in IG as compared between pre- and post-test scores (p < 0.001), while no change was reported in CG (p = 0.23). No statistical significance in proportion of six-month EBF between CG and IG.	Educational sessions could help convey to new mothers the importance of six-month EBF.
Laamiri et al., 2019	Mothers, having given birth through vaginal	Prospective and multi-centre	N= CG: n = 482 IG: n= 463	Educational program on BF	EBF practice	EBF practice (% and duration) was higher in IG	The effectiveness of this prenatal and postpartum BF

	delivery, singleton baby Rabat, Midelt and Khenifra, Morocco	interventional study.		CG: one oral educational session on BF IG: Oral educational session and written and illustrative information on BF Follow-up after 2nd day, 1 week, 3 and 6 months after delivery		(56.6%) compared to CG. (44.7%), p=0.015.	education intervention should be assessed at national level.
Nabulsi et al., 2019	Healthy pregnant women with singleton pregnancy Beirut, Lebanon	Parallel group, randomized clinical trial	N= 362 IG: n = 174 CG: n= 188	A multi-component intervention including: 1: antenatal breastfeeding education 2: professional support 3: and peer support. Intervention delivered in both hospital and home settings. Duration: 6 months	Six-month EBF EBF at 1, 3 months. Knowledge, attitude, and behaviour related to EBF of mothers at 6 months, Satisfaction of the mothers with the intervention	Adjusted analysis showed that practicing 6-months EBF was twice as likely in the IG relative to CG (OR = 2.02; 95% CI: 1.20 to 3.39). Knowledge related to BF increased significantly in IG after 6 months (p<0.001) compared to CG. Behaviour and attitudes showed no significant changes between groups.	Evaluation of the cost-effectiveness of this strategy at the national level. Exploration of the best methods to help mothers improve their attitudes towards BF.
Health Institution level							
Chaouachi et al., 2011	Health professionals Tunis, Tunisia	Prospective intervention study	N= 1121 CG: n= 435 IG: n= 686	Training program CG: No training IG: Training program including	Proportion of mothers practicing EBF and BF after 1, 6 and 12 months.	IG health centre showed significant increase in BF practice based on the age of the babies compared to CG.	Health professionals should be trained to support BF in mothers and to promote the practice and maintenance of BF.

				how to promote and follow up on BF. Follow-up after 1 month, 6 and 12 months.		The mean duration of the breastfeeding practice was 13 months for the IG health centre versus 5 months for the CG health centre (p <0.0001). The support provided by the health professionals was the only factor correlated with BF continuation (RR: 5.16 CI 95%: [3.52-4.93], p <0.0001).	
Clermont et al., 2021	Mothers who have given birth at the Clemenceau Medical Center (CMC) Beirut, Lebanon	Intervention study	N = 326 births "Lead-in" N= 245 birth "Intervention " (Phases 1-3) N=1,431 births "Follow-up"	A comprehensive BFHI intervention composed of three phases, all aiming to promote EBF: Phase I: Hospital policies and infrastructure Phase II: Healthcare staff practice Phase III: Patient education Follow-up at 24 months	Knowledge and practice of mothers regarding EBF	EBF significantly increased post-intervention by + 2.0 % / month (p = 0.006) over the 24 months of follow-up The recorded rate of EBF at hospital discharge increased from 2.4 to 49.0 % of babies from the 1st to the final month of recorded data.	The implementation of the BFHI was effective in promoting EBF by providing support through the hospital environment and health provider practices.
Community level							
AlGhazal et al., 2015	Health Centers and hospitals Sharjah Emirate, UAE	Intervention study	Population of Sharjah	A multi-sectorial, multi-directional baby initiative BF campaign implemented four initiatives:	EBF rate	The exclusive breastfeeding rate in MOH hospitals at discharge increased from 70% to 95% Rate of EBF for the first 6 months of infant's age	BF promotion and support are positively impacted by this BF campaign, as demonstrated by the EBF rate achieved. This or similar programs should be implemented to increase EBF rate.

				1- Baby-Friendly Health Facility, 2- Mother-Friendly Workplace, 3- Breastfeeding-Friendly Nursery, 4- Mother-Baby Friendly Public Place. Follow-up at 2 years following launch of campaign		increased from 18.1% to 39.86%.	
Kurdi et al., 2020	Community beneficiaries of Social Fund for Development Al Hodeidah, Yemen	Cluster randomized control trial	N=997 at baseline and 973 post intervention	The Yemen Cash for Nutrition programme composed of monthly nutrition and health education sessions for participants. Multicomponent program including training on EBF until 6 months.	Knowledge and practice related to early initiation of BF and practice of EBF	The probability of BF initiation within the first hour after delivery increased by 15.6% points ($p < .05$; CG = 74.4% and IG = 83.6%) The probability of EBF during the first 6 months increased by 14.4% points (CG = 13.5% and IG = 25.3%).	The effectiveness of the nutrition training sessions as a part of cash transfer humanitarian response was evidenced by behaviour change by mothers. Involvement of teachers from the community and consideration of local culture resulted in equal impact on both literate and illiterate women in breastfeeding knowledge and behaviour.
Primary outcome: Any breastfeeding							
Individual level							

Abuidhail et al., 2017	Postpartum mothers Amman, Zarqa and Irbid, Jordan	Quasi-experimental, non-equivalent control group pre-post intervention	N=216 IG: n= 131 CG: n= 131	Postnatal BF education Session Follow-up after 1 month	Five components of BF measured by LATCH scale. The 5 components are: 1- Latch, 2- audible swallowing, 3- type and shape of the nipple, 4- comfort level, and 5- hold positioning	Significant difference of postpartum mothers in IG who demonstrated skills of correct positioning increased after being educated, compared to CG, as demonstrated by total LATCH score ($p=0.004$)	Postnatal breastfeeding education is effective in encouraging mothers to practice BF and EBF
Hanafi et al., 2014	A cohort of gravid women Medina, Saudi Arabia	Controlled pre- and post-study	N= 360 CG: n = 180 IG: n= 180	A 30-min health education session Follow-up during postnatal visit (1 week to 2 months postpartum)	KAP of mothers related to BF	KAP post-intervention scores were significantly higher in IG compared to CG ($p<0.05$). Important predictors of KAP changes related to BF were Mode of delivery (OR, 2.5), educational level (OR, 1.6), age (OR, 5.6), parity (OR, 2.5), work status (OR, 3.3) and motivation from mothers, other relatives, and health care workers (OR, 3.7, 2.1, 4.1, respectively)	Health education was effective in promoting KAP related to BF. The role of the healthcare provider should be promoted in disseminating knowledge and motivating mothers to BF.
Youssef et al., 1993	Mothers together with their first-born full-term healthy infants aged 0-12 months Cairo, Egypt	Pre- and post-intervention program	N=60 CG: n=30 IG: n=30	Education program	Knowledge and practice of mothers regarding BF.	The knowledge and practice of mothers regarding BF significantly increased post-test in the study group ($p<0.01$)	Education programs can increase BF as they impacted mothers' knowledge and practice of BF, and the growth of their children. Such programs should be implemented to increase BF adherence and child health.

						Knowledge and practice of BF were significantly correlated (p<0.01).	
Health Institution level							
Amsalu et al., 2020	Health Centers Bossaso, Somalia	Quasi-experimental pre- post-study	N= 4 health centers, N=419 mother-newborn pairs (who were enrolled and continued in follow up)	A multicomponent training program for health care providers, including breastfeeding education Follow-up post training and at 18 months	Knowledge of health care providers regarding early BF	The knowledge of health care providers regarding early BF increased significantly from pre- to post-training, with a mean difference in score of + 11.9% (p< 0.001) and remained post-training at 18-months after training with a mean difference of + 10.9% (p< 0.001). The proportion of early initiation of BF increased significantly from 30.1% to 83.7% (p< 0.001).	The feasibility and effectiveness of the intervention was demonstrated by improvement of essential newborn care. Knowledge and skills gained after training were retained at the 18-month follow-up.
Community level							
McDivitt et al., 1993	Mothers of children ≤ 2 yrs. Jordan (nationwide)	Education intervention program	N= 800 in pre-intervention (in 1988) N=777 in post-intervention (in 1990)	A seminar and media campaign on BF	Timing of breastfeeding initiation KAP of mothers related to BF	The percent of mothers initiating BF showed significant increase (from 90.5 to 97.2 percent (p<.0001). A significant increase of knowledge (from 51 to 75 %) that mothers should initiate breastfeeding within 6 hours of her baby's birth was obtained (p<.0001)	The situation of the mother and her surrounding circumstances should be considered in communication and social marketing programs aiming to promote timely initiation of BF behaviour. Providing adequate knowledge on BF initiation and colostrum should be integrated in a

						A significant increase (40% to 72%) of mothers answering correctly to all four questions in the colostrum/first-milk scale (p<.0001).	comprehensive education program which also should addresses policymakers and hospital administrators and staff.
Primary outcome : Breastfeeding knowledge and attitude							
Individual level							
Alnasser et al., 2018	Pregnant women Riyadh, Saudi Arabia	Pre- and post-intervention study	N=245	Educational EBF Follow-up immediately after intervention	Intention to EBF using mobile health (mHealth)	Percentage of expectant mothers having intention to EBF increased from 46.1% pre- intervention to 80.8% post- intervention Positive intentions were associated with advance maternal age, prior breastfeeding knowledge, and willingness to hear experts' opinions. Expecting mothers' perspectives on importance of others' opinion on their decision was as follows their mothers and husbands (equal scoring) then mothers-in-law.	Educational materials disseminated utilizing mHealth can enhance intentions for EBF.
Piro and Ahmed, 2020	Pregnant women Erbil, Iraq	Experimental design	N=130 CG: n= 65 IG: n = 65	Two 60–90 min of BF educational sessions	Knowledge and attitudes of mothers	The IG had significantly higher BF self-efficacy during pregnancy and	Antenatal BF education sessions can lead to an increased level of

				Follow-up at 2 months after delivery	regarding BF, using prenatal and postnatal self-efficacy measure	following two months of delivery compared to CG (P<0.05). The level of knowledge and attitude of IG were significantly higher in comparison CG (P<0.05). Levels of postnatal self-efficacy were higher in mothers who breastfed their babies in both IG and CG compared to formula feeding mothers (52.00 vs. 39.45 in the CG and 57.69 vs. 36.00 in the IG, P<0.001).	BF self-efficacy, which positively effects EBF practice
Mostafa et al., 2019	Interns Cairo, Egypt	Pre-post interventional design	N=137	Educational sessions on BF Follow-up after 3 months	Knowledge and attitudes towards BF	Significant improvement in knowledge (benefits for the baby, colostrum, duration, complementary feeding, and breast milk expression) of participants after 3 months (p-value <0.05) Significant improvement in attitudes of interns immediately after the intervention. 96.8% of male reported that they would encourage their wives to breastfeed their babies as future fathers at baseline, immediately after, and 3 months after the intervention (p>.05).	There is a real and urgent need in improving knowledge and attitudes of health professionals by integrating content related to BF in curricular and extracurricular activities.
Health institution level							

Al-Nuaimi et al., 2019	Nurses and midwives Amman and Ar Ramtha, Jordan	Pre- and post-intervention test	N=82 IG: n= 42 CG: n= 40	Educational workshop of 2 hours 2 weeks follow-up	KAP related to BF	Significant increase in knowledge and practice related to BF in IG (11.7±2.6) compared to the control group (8.38± 2.59) post workshop (p-value<0.001)	BF education workshops are recommended for all maternal and child health professionals at all levels. Updating and including practice-based learning in the content of the training and educational workshop is also recommended.

Abbreviations:
BF: Breastfeeding
BFHI: Baby Friendly Hospital Initiatives
CBPP: ChildBirth Preparation Program
CG: Control Group
EBF: Exclusive Breastfeeding
IG: Interventional Group
KAP: Knowledge, attitude, and practice
OR: Odds Ratio

SUPPLEMENTAL MATERIAL FILE AS APPENDIX

Authors (Year)	Target Population/Country	Target group	Type of Study	Sample Size	Type and details Intervention	Policy	hw training	patient ed	HW support/home visits	Fam support	Peer support	Total	Knowledge	Attitude	BF Initiation	EBF	Any breastfeeding	12+ Continued BF	Total	Measured parameters	Main Results
Primary outcome: Exclusive breastfeedine																					
Individual level																					
Ahmed, 2008	Mothers and their preterm infants (born <37 weeks of gestation) Cairo, Egypt	Post	Experimental design	N=60 CG: n=30; IG: n=30	Five-session educational BF program during hospitalization and after discharge. Follow up: 3 months after discharge.			1				1	1			1			2	BF Knowledge EBF rates at 3 months	Knowledge related to BF increased significantly in IG (p = 0.041), but not in CG BF practices improved progressively in the IG 3:80% of IG were discharged on EBF, versus 40% among the CG
Baih, 2020	Postnatal primipara mothers and their live newborns Cairo, Egypt	Post	Pre- and post- intervention study	N=162	Neonatal care educational intervention, including BF Follow-up at 4 weeks			1				1	1			1			2	EBF Knowledge EBF rates	There was an increase in maternal satisfaction pre- and post-intervention (p<0.05), as follows: Pre-lactal feeding from 64.3% to 71% EBF from 40.7% to 95.1% BF practice from 24% to 69.1%. Colostrum feeding 56.2% to 81.5%
Bashour et al., 2008	New mothers Damascus, Syria	Post	Randomized controlled trial	N= 876 IG (A): n=285, 4 visits IG (B), n= 294, 1 visit CG: n= 297, No visit.	Multicomponent education program, including BF, delivered through postnatal home visits. Follow-up at 4-months post-partum			1	1			2				1			1	EBF at 4 months	The proportion of new mothers in IG A and B who breastfed their infants (28.5% and 30%, respectively) was increased compared with Group C (20%).
Bennis et al., 2017	Pregnant women Rabat, Morocco	Pre	Prospective cohort study	IG: n=372 CG: n=178	Educational sessions about benefits and management of BF (oral and written information) Six months follow-un through teleohone			1				1				1			1	EBF rates at 6 months	55.2% of IG exclusively breastfed their babies up to the age of six months compared to 38.8% in CG (p = 0.002).
Khresheh et al., 2018	Primigravid women Amman, Jordan	Pre	Exploratory, descriptive design and action research approach	N= 36	A CBPP composed of many topics provided over a period of 6 months (2nd and 3rd trimester), one focused on BF Follow-up after 2 months		1	1				2				1			1	EBF rates at 2 months	The CBPP helped reinforced the practices of breastfeeding as about 89% of mothers maintained EFB until 2 months.
Khresheh et al., 2011	Primiparous women (given birth to a healthy, full term, singleton baby) Southern Region, Jordan	Post	Randomized controlled trial	N = 90 IG: n=45, CG: n=45	IG: one-on-one postnatal educational session; Follow-up phone calls at 2 and 4 months postpartum CG: routine postnatal care.			1	1			2	1			1			2	EBF for 6 months Knowledge of mothers related to BF at 6 months postpartum.	Significant increase in knowledge and practice related to BF in IG as compared between pre- and post-test scores (p < 0.001), while no change was reported in CG (p = 0.23). No statistical significance in proportion of six-month EBF between CG and IG
Laamiri et al., 2019	Mothers, having given birth through vaginal delivery, singleton baby Rabat, Midelt and Khenifra, Morocco	Post	Prospective RCT and multi-centre interventional study.	N= 945 CG: n = 482 IG: n= 463	Educational program on BF CG: one oral educational session on BF IG: Oral educational session and written and illustrative information on BF Follow-up after 2nd day, 1 week, 3 and 6 months after delivery			1				1				1			1	EBF duration through 6 months	EBF practice (% and duration) was higher in IG (56.6%) compared to CG. (44.7%), p=0.015.
Nabulsi et al., 2019	Healthy pregnant women with singleton pregnancy Beirut, Lebanon	Pre	Parallel group, randomized clinical trial	N= 362 IG: n = 174; CG: n= 188	A multi-component intervention including: 1: antenatal breastfeeding education, 2: professional support, 3: and peer support delivered in both hospital and home settings for 6 months.			1	1		1	3	1			1			2	EBF at 1, 3 and 6 months Satisfaction of the mothers with the intervention Knowledge, attitude, and behaviour related to EBF of mothers at 6 months	Adjusted analysis showed that practicing 6-months EBF was twice as likely in the IG relative to CG (OR = 2.02; 95% CI: 1.20 to 3.39). Knowledge related to BF increased significantly in IG after 6 months (p<0.001) compared to CG. Behaviour and attitudes showed no significant changes between groups.
Health Institution level																					
Chaouachi et al., 2011	Health professionals Tunis, Tunisia	Health prof	Prospective intervention study	N= 1121 CG: n= 435 IG: n=686	Training program CG: No training IG: Training program including how to promote and follow up on BF. Follow-up after 1 month, 6 and 12 months.		1					1				1		1	2	EBF at 1 and 6 months; continued BF at 12 months.	IG health centre showed significant increase in BF practice based on the age of the babies compared to CG. The mean duration of the breastfeeding practice was 13 months for the IG health centre versus 5 months for the CG health centre (p <0.0001). Rate of EBF at 6 months: 11.0% vs. 4.3% (P=0.0001) The support provided by the health professionals was the only factor correlated with BF continuation (RR: 5.16 CI 95%: [3.52-4.93], p <0.0001)
Clermont et al., 2021	Mothers who have given birth at the Clemenceau Medical Center (CMC) Beirut, Lebanon	Post	Intervention study	N = 326 births "Lead-in" N= 245 birth "Intervention" (Phases 1-3) N=1431 births "Follow-up"	A comprehensive BFHI intervention composed of three phases, all aiming to promote EBF: Phase I: Hospital policies and infrastructure, Phase II: Healthcare staff practice, Phase III: Patient education, Follow-up at 24 months	1	1	1				3				1			1	EBF rates	EBF significantly increased post-intervention by + 2.0 % / month (p = 0.006) over the 24 months of follow-up the recorded rate of EBF at hospital discharge increased from 2.4 to 49.0 % of babies from the 1st to the final month of recorded data.
Community level																					
AlGhazal et al., 2015	Health Centers and hospitals Sharjah Emirate, UAE	Community	Intervention study	Population of Sharjah	A multi-sectorial, multi-directional baby initiative BF campaign implemented 4 initiatives:1- Baby-Friendly Health Facility, 2- Mother-Friendly Workplace, 3- Breastfeeding-Friendly Nursery, 4- Mother-Baby Friendly Public Place. Follow-up at 2 years following launch of campaign	1	1	1	1			4				1			1	EBF rate at 6 months	The exclusive breastfeeding rate in MOH hospitals at discharge increased from 70% to 95%. Rate of EBF for the first 6 months of infant's age increased from 18.1% to 39.86%.
Kurdi et al., 2020	Community beneficiaries of Social Fund for Development Al Hodeidah, Yemen	Community	Cluster randomized control trial	N=997 at baseline and 973 post intervention	The Yemen Cash for Nutrition programme composed of monthly nutrition and health education sessions for participants. Multicomponent program including training on EBF until 6 months.			1				1	1		1	1			3	EBF rates at <6 months Knowledge and practice related to early initiation	The probability of BF initiation within the first hour after delivery increased by 15.6% points (p < .05; CG = 74.4% and IG = 83.6%) The probability of EBF during the first 6 months increased by 14.4% points (CG = 13.5% and IG = 25.3%).

Any breastfeeding																					
Individual level																					
Abuidhail et al., 2017	Postpartum mothers Amman, Zarqa and Irbid, Jordan	Post	Quasi-experimental, non-equivalent control group pre-post intervention	N=216I G: n= 131 CG: n= 131	Postnatal BF education session Follow-up after 1 month			1				1			1				1	Five components of BF measured by LATCH scale. The 5 components are: 1- Latch, 2- audible swallowing, 3- type and shape of the nipple, 4-comfort	Significant difference of postpartum mothers in IG who demonstrated skills of correct positioning increased after being educated, compared to CG, as demonstrated by total LATCH score (p=0.004)
Hanafi et al., 2014	A cohort of gravid women Medina, Saudi Arabia	Pre	Controlled pre- and post-study	N= 360 CG: n = 180 IG: n= 180	A 30-min health education session Follow-up during postnatal visit (1 week to 2 months postpartum)			1		1		2	1	1	1				3	KAP of mothers related to BF	KAP post-intervention scores were significantly higher in IG compared to CG (p<0.05). Important predictors of KAP changes related to BF were Mode of delivery (OR, 2.5), educational level (OR, 1.6), age (OR, 5.6), parity (OR, 2.5), work status (OR, 3.3) and motivation from mothers, other relatives, and health care workers (OR, 3.7, 2.1, 4.1, respectively)
Youssef et al., 1993	Mothers together with their first-born full-term healthy infants aged 0-12 months Cairo, Egypt	Post	Pre- and post- intervention program	N=60 CG: n=30; IG: n=30	Education program			1				1	1	1			1		3	Knowledge and practice of mothers regarding BF	The knowledge and practice of mothers regarding BF significantly increased post-test in the study group (p<0.01) Knowledge and practice of BF were significantly correlated (p<0.01).
Health Institution level																					
Amsalu et al., 2020	Health Centers Bossaso, Somalia	Health prof	Quasi-experimental pre- post-study	N= 4 health centers, N=419 mother-newborn pairs (who were enrolled and continued in follow up)	A multicomponent training program for health care providers, including breastfeeding education Follow-up post training and at 18 months		1					1	1		1				2	Knowledge of health care providers regarding early BF	The knowledge of health care providers regarding early BF increased significantly from pre- to post-training, with a mean difference in score of + 11.9% (p< 0.001) and remained post-training at 18-months after training with a mean difference of + 10.9% (p< 0.001). The proportion of early initiation of BF increased significantly from 30.1% to 83.7% (p< 0.001).
Community level																					
McDivitt et al., 1993	Mothers of children ≤ 2 yrs. Jordan (nationwide)	Community	Education intervention program	N= 800 in pre-intervention (in 1988) N=777 in post-intervention (in 1990)	A seminar and media campaign on BF		1	1				2	1		1				2	Breastfeeding initiation rates Knowledge of BF initiation	Increase in initiation of breastfeeding within 6 hours of birth (39.9%; 54.3%). Significant increase of knowledge that mothers should initiate breastfeeding within 6 hours of her baby's birth was obtained (51%, 75%; P<0.0001) A significant increase (40% to 72%) of mothers answering correctly to all four questions in the colostrum/first-milk scale (p<.0001).
Breastfeeding knowledge and attitude																					
Individual level																					
Alnasser et al., 2018	Pregnant women Riyadh, Saudi Arabia	Pre	Pre- and post-intervention study	N=245	Educational EBF Follow-up immediately after intervention			1				1	1	1					2	Intention to EBF using mobile health (mHealth)	Percentage of expectant mothers having intention to EBF increased from 46.1% pre- intervention to 80.8% post- intervention Positive intentions were associated with advance maternal age, prior breastfeeding knowledge, and willingness to hear experts' opinions. Expecting mothers' perspectives on importance of others' opinion on their decision was as follows their mothers and husbands (equal scoring) then mothers-in-law.
Mostafa et al., 2019	Interns Cairo, Egypt	Interns	Pre-post interventional design	N=137	Educational sessions on BF Follow-up after 3 months		1					1	1	1					2	Knowledge and attitudes towards BF	Significant improvement in knowledge (benefits for the baby, colostrum, duration, complementary feeding, and breast milk expression) of participants after 3 months (p-value <0.05) Significant improvement in attitudes of interns immediately after the intervention. 96.8% of male reported that they would encourage their wives to breastfeed their babies as future fathers at baseline, immediately after, and 3 months after the intervention (p>.05).
Piro and Ahmed, 2020	Pregnant women Erbilo, Iraq	Pre	Experimental design	N=130 CG: n=65; IG: n=65	Two 60–90 min of BF educational sessions Follow-up at 2 months after delivery			1				1	1	1					2	Knowledge and attitudes of mothers regarding BF, using prenatal and postnatal self-efficacy measure	The IG had significantly higher BF self-efficacy during pregnancy and following two months of delivery compared to CG (P<0.05). The level of knowledge and attitude of IG were significantly higher in comparison CG (P<0.05). Levels of postnatal self-efficacy were higher in mothers who breastfed their babies in both IG and CG compared to formula feeding mothers (52.00 vs. 39.45 in the CG and 57.69 vs. 36.00 in the IG, P<0.001).
Health institution level																					
Al-Nuaimi et al., 2019	Nurses and midwives Amman and Ar Ramtha, Jordan	Health prof	Pre- and post-intervention test	N=82 IG: n=42 CG: n=40	Educational workshop of 2 hours 2 weeks follow-up			1				1	1	1					2	KAP related to BF	Significant increase in knowledge related to BF in IG (11.7±2.6) compared to the control group (8.38± 2.59) post workshop (p-value<0.001); significant improvement in attitudes and clinical practice in some areas between IG compared to CG.
	Pre	6				2	7	18	4	1	1		13	6	5	12	1	1			
	Post	8																			
	Interns	1																			
	Health institutions (health prof)	3																			
	Community	3																			
	Total	21																			