



## Review

# Educational models of infant and young child feeding among prenatal and postnatal women during the COVID-19 pandemic (January 2020–January 2023): A scoping review

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## ABSTRACT

Infant and young children feeding (IYCF) practices, particularly for infants and young children <2 y old, became increasingly challenging during the COVID-19 pandemic. Several studies have discussed various educational models in the pre-pandemic period, most of which were conducted in person. The last reviews on IYCF interventions were conducted in 2020 and were relevant to pre-pandemic contexts. Thus, there is a need to review IYCF interventions to inform educational models adapted to the COVID-19 pandemic. For this relevant literature, we searched PubMed, SCOPUS, EBSCO, ProQuest, Sage Journals, and Wiley Online Library. Thirty-five literature sources were screened, and 7 data sources were included for data extraction and analysis. Many studies on the IYCF educational models focused on exclusive breastfeeding and early initiation of breastfeeding; there was only one study on complementary feeding, and no research was found on continued breastfeeding. Four studies found no significant differences in the intervention given. Three studies had a significant effect, one had in-person meetings, and two consisted of WhatsApp discussions. Most IYCF educational models from the pandemic context comprised online education, whereas WhatsApp was the most popular media used. Future researchers may develop these findings to design research on a larger scale and for a longer period, especially on complementary feeding and continued breastfeeding based on IYCF indicators.

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## Introduction

The unprecedented global, social, and economic crisis triggered by the coronavirus disease-2019 (COVID-19) pandemic posed a critical risk to food security and the survival of young children in various countries [1]. The United Nations Children's Fund (UNICEF) estimates that the COVID-19 pandemic contributed to the deaths of 2 million children <5 y of age. In 2020, the number of malnourished (wasted) children was estimated to have increased by 15% to >7 million [2].

One of the major causes of undernutrition is inadequate infant and young child feeding (IYCF) practices. The World Health Organization (WHO) and UNICEF recommend beginning breastfeeding in the first hour after birth, exclusive breastfeeding, and a suitable start of complementary feeding at  $\geq 2$  y of age [3]. In the aftermath of the COVID-19 pandemic, global health systems face substantial obstacles in providing essential health services. Countries have reported disruptions in all contexts of health care. In more than half of the countries surveyed, many individuals still lack access to primary care and community health care [4].

IYCF practice in infants and young children <2 y of age became increasingly challenging during the COVID-19 pandemic [5]. Importantly, one part of IYCF is the initiation of breastfeeding. To reduce mother-to-child transmission of COVID-19, all mothers

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who gave birth during a pandemic could not initiate early breast-feeding. Mothers require continuous support from the community to provide adequate feeding for their children. Access to maternity services and other necessary health information that a mother should receive from health care facilities was also complicated by restrictions and social distancing policies during the pandemic [6].

Several studies discussed various educational models in the pre-pandemic period, most of which were conducted in person [7–9]. The last reviews on IYCF interventions in low- and middle-income countries (LMICs) were conducted in 2020 [10]. Other reviews were conducted in 2021 but specific to Ethiopia. These two reviews were relevant for pre-pandemic contexts [11]. The COVID-19 pandemic affected IYCF practices and interventions needed to adapt to the pandemic situation. Thus, there is a need to review IYCF interventions to inform educational methods or models that were adapted during the COVID-19 pandemic.

This study performed a scoping review to evaluate the current literature on the COVID-19 pandemic based on specific criteria. The review included a range of limitations and adaptations to continue IYCF education promotion. Key recommendations to facilitate IYCF during a crisis are to protect, promote, and optimally support IYCF through integrated multisectoral interventions and risk reduction efforts [12,13]. A comprehensive understanding of the different interventions that can be used for improving IYCF will facilitate the allocation of resources and develop focused strategies to improve child nutrition. The data will also aid in scaling up and/or enhancing future IYCF interventions in pandemic contexts [14]. This study aimed to describe several variations of the IYCF educational models proposed during the COVID-19 pandemic.

## Methods

A scoping review was chosen as the research method because it can provide the scope and breadth of an important public health topic such as IYCF during the COVID-19 pandemic. This scoping review was conducted according to the Joanna Briggs Institute methodology [15], based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews to ensure rigor in reporting [16]. The scoping review followed the following stages:

- Determining the research question;
- Identifying relevant studies;
- Selecting studies (screening);
- Extracting data (charting the data); and
- Summarizing data and synthesis of the results.

### Determining the research question

The research question in the current scoping review was as follows: What were the educational models regarding IYCF during the COVID-19 pandemic?

### Identifying relevant studies

The following three-step search strategy was used:

- A preliminary search of the following two databases was conducted using various combinations of search terms in PubMed and EBSCO. An academic research librarian was consulted, and an analysis of the words contained in the titles, abstracts, and index terms generated a list of keywords.
- Six scientific databases were used to search articles (PubMed, Sage Journals, SCOPUS, EBSCO, ProQuest, and Wiley Online

Library) based on the search terms. The final search was conducted using the following keywords: [(“Models” OR “program” OR “intervention” OR “project”) AND (“Education” OR “counseling” OR “health education” OR “nutrition education”) AND (“infant and young child feeding” OR “infant feeding” OR “early initiation breast-feeding” OR “exclusive breast-feeding” OR “complementary feeding” OR “continued breast-feeding”) AND (“pandemic” OR “covid-19” OR “Coronavirus”)].

- The references of key articles that were identified for full text review and that met the inclusion criteria were examined. No authors were contacted for additional information.

### Inclusion and exclusion criteria

All primary studies and quantitative analyses of IYCF educational models were included in this review. The IYCF educational model is any educational intervention model that includes one of the following IYCF practices: early breastfeeding initiation, exclusive breastfeeding, complementary feeding, and continued breastfeeding for 12 to 23 mo. This study examined research articles published between January 2020 and January 2023, such that 3 y of research was included in the review. The educational interventions and related studies that started before the pandemic and were adjusted during the pandemic were not included.

The following inclusion criteria were required for scientific articles to be considered for review in this study:

- Conducted during the COVID-19 pandemic;
- Used a quantitative research design;
- Included an intervention IYCF education model; and
- Consisted of research participants who were pregnant women, postpartum women, or mothers with children <2 y of age.

Research that used vulnerable participants, such as mothers with HIV, diabetes mellitus, or mental health problems and adolescents, were excluded. Research protocols and review articles were also excluded. All papers had to be written in English. Posters, editorials, and abstracts from conferences were excluded during the analysis process.

### Study selection

In this process, the study was accessed using Mendeley Desktop Version 1.19.8. Two reviewers independently read the title and abstract of a retrieved study and provided recommendations as to whether studies should be included or excluded. The screening was carried out carefully, and duplicates were removed. Then, the reviewer read the included articles and independently assessed the suitability of the articles for inclusion in the next stage. If there were discrepancies concerning the included or excluded articles selected at the preliminary stage, the articles would be re-read. If still unclear, a third reviewer was included to evaluate whether the article should be included or excluded. The overall results are shown in [Figure 1](#).

### Charting of the data

Data were extracted from the eligible articles using a Microsoft Excel spreadsheet, including author, year of publication, country of research, purpose, methodology, number and type of participants, intervention, concept, duration of intervention, outcomes measured, and key findings. Key findings included breastfeeding initiation, exclusive breastfeeding from 0 to 6 mo, complementary feeding, and continued breastfeeding from 12 to 23 mo.

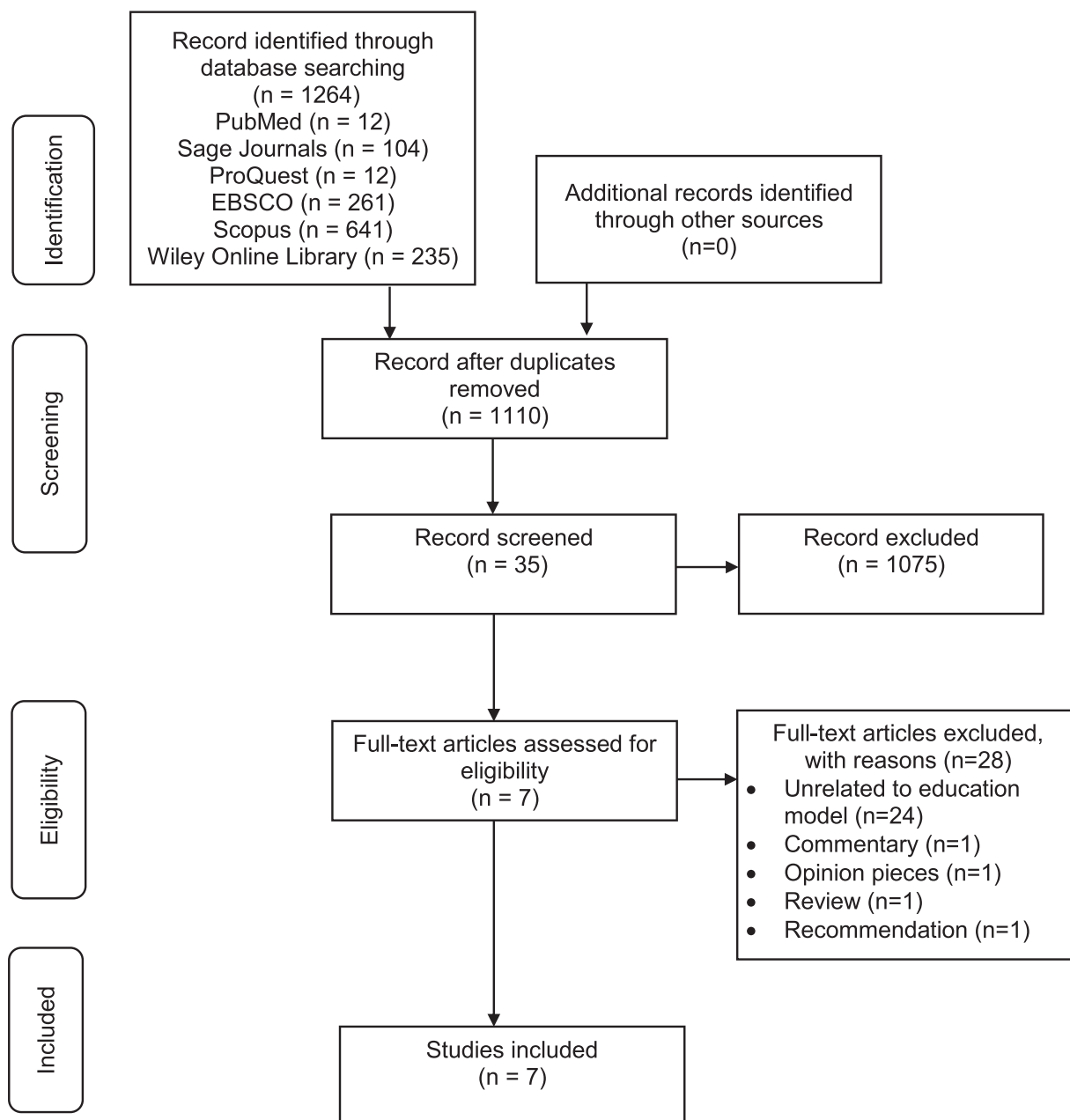


Fig. 1. PRISMA flow diagram.

### Collecting, summarizing, and reporting results

All studies meeting the inclusion criteria were subsequently read, re-read, and summarized by one researcher. Inductive content analysis was used to code and classify information according to different categories (relevant to the components of the IYCF practice educational model), and information from similar themes across studies was grouped. A first draft of the analysis results was developed by the same researcher and reviewed by all co-authors.

## Results

### Literature search and identification of included studies

We identified 1264 records. From these records, 1110 remained after the removal of duplicates. When screening titles and

abstracts, 35 documents were identified as “Yes” or “Maybe,” and 1075 were excluded for not meeting the eligibility criteria. Full-text screening was done for the 35 documents, and from this, 7 articles were finally included for data extraction.

### Study characteristics

Data was extracted from seven studies. Six studies were conducted in Asia (two in Hong Kong, two in Indonesia, Turkey, and Sri Lanka) and one in the United States. Among the seven studies, the methodologies used included three random controlled trials, two quasi-experimental studies, and two quantitative–qualitative mixed-methods studies. Only four of the seven studies used concepts as the basis of intervention. Three others directly implemented the intervention. There were several theoretical concepts, including Dennis’ Breastfeeding Self-Efficacy framework, Theory of

Planned Behavior, Hierarchy of Effect Model, and Bandura's Social Learning Theory (Table 1) [17–23].

#### Component and media education of IYCF intervention

From the seven included studies, many on the IYCF educational models used in the pandemic context focused on breastfeeding (including early initiation of breastfeeding), whereas there was only one on complementary feeding. No research was found on continued breastfeeding. Table 2 lists the components of the IYCF education models in the eligible studies [17–23]. Three of the seven interventions only used WhatsApp to send educational materials and discussion forums. The materials sent included PowerPoint presentations, text descriptions, posters, and a video tutorial. One other intervention used a combination of bulk short-messaging systems and social media (WhatsApp, Viber, YouTube video), one used a combination of Zoom and telephone, one used limited in-person, and one used audiovisual (Table 1) [17–23].

#### Effect of the intervention on IYCF improvement

Four of the seven studies reported no significant difference in the given intervention. Three studies had a significant effect, namely face-to-face meetings covering prenatal education classes, and two others, namely discussions using WhatsApp that sent material in the form of PowerPoint presentations, descriptive text, posters, and video tutorials.

## Discussion

This scoping review identified various educational models of IYCF implemented during the COVID-19 pandemic. The need for alternative approaches to improve the practice of IYCF was further emphasized by the unpredictable nature of the epidemic and its unprecedented associated social restrictions. The present findings demonstrated that WhatsApp was the most common educational media used [18,20–22]. WhatsApp functions as a means of sending material through the application, including texts, links, and videos, or serves as a means of assisting with consultation, discussion, sharing, and question-and-answer exchanges, including forming WhatsApp groups [20,22]. Other educational media used were social media (Viber, YouTube videos), telephone calls, and Zoom meetings [18,21].

Many factors contribute to the use of WhatsApp as a media channel, including its popularity as a digital platform for mothers in various countries, the ability for many people to participate in training sessions relating to nutrition, and its accessibility, which reduces time and expense. In addition to these advantages, all models of smartphones have free access to WhatsApp [18].

This review also documented how the educational models used during the pandemic were mostly online. There were some differences in educational models between high-income countries and LMICs. High-income countries, such as the United States, tended to use education through health promotion videos using Zoom or tele-lactation [17,32]. Programs in the LMICs tended to use interactive messaging apps such as WhatsApp [18,21,22]. Although the same terms, *mobile health (mHealth)* or *telehealth education*, were applied to these modalities, the educational media used differed.

This gap in health promotion and education access may be due to the infrastructure and technical barriers LMICs face in implementing mHealth. In addition to the technical obstacles, barriers included insufficient network capacity and limited access to mobile phones [33]. For realistic long-term implementation, mHealth also requires a broader and more expensive infrastructure of health

systems, technology, and industry [34]. Similar barriers for service providers and recipients should be identified through further research [21]. Furthermore, mHealth is easily integrated into virtual platforms compatible with social distancing measures. Additionally, the COVID-19 pandemic made teaching in person difficult; therefore, timely and user-friendly online interventions developed during the crisis have remained in use even after the pandemic [35].

Not all results from this review used IYCF indicators from UNICEF in their intervention outcomes. This is because the review was conducted from January 2020 to January 2023, whereas a new IYCF indicator was published by UNICEF in 2021 [36]. We used four components of IYCF: breastfeeding, exclusive breastfeeding, complementary feeding, and continued breastfeeding [37]. Continued breastfeeding did not receive educational interventions in the results of this review. Studies showed that continuation of breastfeeding in low-income countries is higher than in high-income countries. In low-income countries, >60% of children are breastfed for 20 to 23 mo, whereas in high-income countries, only 6% to 8% of mothers continue breastfeeding after 2 y [38,39]. Despite the benefits of long-term breastfeeding, most mothers and babies do not benefit from the additional benefits of continuous breastfeeding [40]. Most factors associated with not continuing breastfeeding may be a lack of additional support from health professionals, peers, families, and partners at home [41]. Another factor in not continuing breastfeeding is the need to return to the workplace [42,43]. During the breastfeeding transition, returning to work is common for mothers to manage work and breastfeeding. Combining breastfeeding and work may be hard for mothers depending on their working conditions, public health policy, and economy [44–46].

The intervention participants varied, but most of the targets were pregnant women [17,19–22]. Only two studies provided educational interventions for postpartum mothers and mothers with children 0 to 24 mo [18,23]. IYCF knowledge is crucial for pregnant women to promote optimal infant-feeding practices during the first 1000 days of life [47,48]. Antenatal care (ANC) services are an ideal entry point for providing multiple health and nutrition interventions promoting maternal and child health, breastfeeding behavior, and birth preparedness [49]. These recommendations highlight the importance of quality of care in ensuring a good pregnancy experience. ANC also enables the mother to start breastfeeding immediately after birth and provides support for exclusive breastfeeding for a period of 6 mo [50].

Not all studies include the content of the intervention. Studies only mentioned that participants were added to a group in which they were encouraged to pose questions, discuss relevant issues, and receive support. The researchers sent out invitations to participants to ask questions and provide relevant information. Furthermore, as part of the intervention, they offered advice to the participants and exchanged experiences while answering questions [18,22]. Peiris et al. discussed five intervention themes: pregnancy care, breastfeeding, complementary feeding, diet and food, sex-related and cash management [21]. Rachmah et al.'s intervention topics consist of several complementary feeding-related matters, growth monitoring, and hands-on activities, including practice reading packaged food labels and self-developing a complementary feeding menu [18]. The intervention content discussed in the study by Wong et al. consisted of common breastfeeding problems and case scenarios of breastfeeding difficulties [17]. Baransel et al. provided information that informed participants about safe breastfeeding during the COVID-19 pandemic, including general information about COVID-19, methods for protection from the disease, and mental health, breastfeeding, and safety during the pandemic [19].

**Table 1**  
Summary of the articles included in this review (N = 7)

First author, year published and country	Purpose	Study population and sample size	Methodology	Intervention type and comparator	Concept	Duration of intervention and how outcomes are measured	Key findings
Wong et al. (2022), Hong Kong [17]	To test the feasibility and effectiveness of a theory-based, real-time online educational and support program for breastfeeding-related outcomes.	Population: pregnant women with low-risk primiparous Sample: 40	RCT	The intervention consisted of a real-time antenatal discussion with experience-sharing via Zoom, followed by daily online individualized breastfeeding counseling postpartum and seven weekly telephone follow-ups. During the pandemic, an IBCLC conducted the intervention via Zoom and telephone interactions.	Dennis' Breastfeeding self-efficacy frame-work	Duration of intervention: ≥32 wk pregnancy follow-up at 2 mo of birth The exclusive breastfeeding rate, partial breastfeeding, and initiation breastfeeding was reported using the author-created online questionnaire. Breastfeeding self-efficacy was measured using the Hong Kong Chinese version of the Breastfeeding Self-Efficacy Scale- Short Form (Ip et al. [24]). Maternal postnatal depression was measured by using the Chinese version of the Edinburgh Postnatal Depression Scale (Lee et al. [25]).	There were slightly more participants in the intervention group who exclusively breastfed their infants than in the control group (n = 7, 54% and n = 9, 53%), but no significant difference was found between the two groups on the exclusive breastfeeding rate at 2 mo postpartum (P = 1.0). No significant difference was found between the two groups on the partial breast-feeding (P = 1.0) Participants in the intervention group were 2.3 times more likely to start breastfeeding within the first hour of delivery (RR, 2.29; 95% CI, 0.55–9.57) compared with the control group.
Rachmah et al. (2023), Indonesia [18]	To analyze the effectiveness of nutrition education using online digital platforms (WhatsApp) to improve a mother's behavior in providing nutritious complementary food based on the theory of planned behavior approach.	Population: mothers with children ages 0–24 mo Sample: 155	Quasi experimental with one pretest and post-test design groups	10 educational sessions were developed to improve one or more TPB constructs. Media used for education were PowerPoint, text description, posters, and video tutorials; implemented by sending materials through the WhatsApp application.	Theory of Planned Behavior Approach	Duration of intervention: 1 mo Mother's nutrition knowledge was measured using a questionnaire that was validated and tested before the data collection, consisting of 10 questions. All the psychological data questionnaires were developed as Likert-scale answers based on Bandura's guide for constructing attitude, subjective norm, perceived behavioral control, self-efficacy, and intention scales.	10 sessions of nutrition education and counseling covered over 8 d increased mother's knowledge (60 ± 15.5 vs 80.3 ± 15, perceived behavioral control (3.78 ± 0.9 vs 4.12 ± 0.12), and intention toward giving nutritious complementary feeding (4.11 ± 1 vs 4.30 ± 0.9; P < 0:005). WhatsApp nutrition education proved to be effective in improving mother's knowledge and behavior in providing nutritious complementary food.
Sabancı Baransel et al. (2022), Turkey [19]	To investigate the effectiveness of prenatal breastfeeding education provided to pregnant women who experienced fear of breastfeeding during the COVID-19 pandemic.	Population: pregnant women in the third trimester of first pregnancy (between weeks 29 and 36) Sample: 128	RCT	The intervention group received the breastfeeding education in two sessions at the prenatal education class with theme "Safe breastfeeding in the COVID-19 pandemic. Reinforcing education was provided in the postnatal period. The control group was provided the breastfeeding education included in standard care of the hospital (health care personnel	-	Duration of intervention: 4 mo NPRS was assessed NPRS questionnaire scale by Noble et al. [26] The BMS was assessed. BMS questionnaire scale by Kestler-Peleg et al. [27] consisting of 24 items. The IIFAS was assessed using the IIFAS questionnaire. The Turkish validity and reliability studies by Eksioğlu et al. [28], consisting of 17 items.	1 mo after birth the experimental group's rates of feeding their babies exclusively with breast-milk were significantly higher compared with the control group (P < 0.001). The result of study was that the breastfeeding fears of the participants in the experimental group significantly decreased during the postnatal period compared with participants in the control group (P = 0.001).

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Table 1 (Continued)

First author, year published and country	Purpose	Study population and sample size	Methodology	Intervention type and comparator	Concept	Duration of intervention and how outcomes are measured	Key findings
Wulandari et al. (2021), Indonesia [20]	To determine the effectiveness of the mobile-health interactive message on the postpartum care behavior of mothers and their husbands.	Population: pregnant women in the third semester and their husbands Sample: 88 pairs	A quasi-experimental design	at the clinic before they were discharged). Interactive mHealth message intervention used in the form of flyers (text, images), videos, and assistance (consultation, discussion, sharing, and question-and-answer) using WhatsApp groups. The intervention was carried out every day, 5 h/d, for 14 d, followed by random flyers from delivery to 42 d after delivery. Controls were not included in the WhatsApp group and received regular counseling from the local community health center.	-	Duration of intervention: 14 wk Knowledge, attitudes, and practices for breastfeeding was assessed using questionnaire, knowledge, attitudes, and support for husband was assessed using questionnaire.	The effect of interventions on mother and husband's practices in early initiation of breastfeeding ( $P = 0.029$ , RR, 1.68; 95% CI, 1.120–2.523). Exclusive breastfeeding for 42 d ( $P = 0.706$ , RR, 0.84; 95% CI, 0.551–1.379). Intervention for 2.5 mo increased the knowledge of mothers and husbands. The intervention for 3.5 mo improved the mother's attitude, but not the husband's.
Peiris et al. (2023), Sri Lanka [21]	To examine the effectiveness of a mobile phone-based nutrition education intervention targeting pregnant and nursing mothers in 6 Sri Lankan divisional secretariat areas.	Population: pregnant and nursing mothers Sample: 996	A quantitative and qualitative (pre- and post-intervention).	The intervention delivered 19 messages via mobile phones, such as text messages (bulk short-messaging system) and social media such as WhatsApp, Viber, and YouTube videos.	Hierarchy of effect Model	Duration of intervention: 3 mo To assess knowledge and awareness, a multi-item questionnaire with 15 questions was used. To measure attitudes (5 questions), social norms (5 questions), self-efficacy (5 questions), and intentions (3 questions), the consumption pregnant and nursing mothers was assessed using minimum dietary diversity of women. A qualitative assessment was measured using a semi-structured questionnaire by conducting telephone interviews with 30 participants.	1996 pregnant and nursing mothers participated in the pre-assessment survey. Of those, 720 completed the post-assessment. Knowledge/awareness ( $t = -18.70$ , $P < 0.01$ ), attitudes ( $t = -2.00$ , $P < 0.05$ ), breastfeeding practice ( $t = -5.65$ ) increased when exposed to the intervention. However, social norms and behavior intentions did not significantly improve.

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Table 1 (Continued)

First author, year published and country	Purpose	Study population and sample size	Methodology	Intervention type and comparator	Concept	Duration of intervention and how outcomes are measured	Key findings
Fan et al. (2022) Hong Kong [22]	To examine the feasibility and acceptability of an online instant messaging peer support group for breastfeeding and to evaluate the effect of the intervention on breastfeeding outcomes.	Population: primiparous women Sample: 33	A pilot RCT	SoC and peer support group on a popular online messaging mobile app, WhatsApp (“WhatsApp group”) for intervention group. Control group received only SoC.	Bandura’s Social learning Theory	Duration of intervention: 6 mo Primary outcome: A feasibility assessment was carried out of the proportion of women who agreed to participate and completed a follow-up. Assessment of acceptability was carried out using the perceived helpfulness and perceptions of intervention. Qualitative interviews have been used to assess the perception of the intervention. Secondary outcome: The breastfeeding outcomes assessed were the proportions of any breastfeeding and exclusive breastfeeding at 1, 2, 4, and 6 mo postpartum. The breastfeeding self-efficacy was used to measure using the BSES-SF The breastfeeding attitude of the participants was been measured with the IIFAS.	This pilot study shows that online messaging peer support group is feasible and acceptable to women. The eligible women agreed to participate (54%) and 97% completed the follow-up. No significant differences were found in any and exclusive breastfeeding rates, breastfeeding attitude, and breastfeeding self-efficacy between the 2 groups. As for exclusively breastfeeding, when compared with the control group, participants in the intervention group were not more likely to exclusively breastfeed at 1 mo (33% vs 20%; $P = 0.458$ ), 2 mo (44% vs 33%; $P = 0.722$ ), 4 mo (33% vs 47%; $P = 0.493$ ) and 6 mo (22% vs 27%; $P = 1.000$ ) postpartum.
Bogulski et al. (2022), Arkansas, US [23]	To identify facilitators and barriers of 2 modes of tele-health service utilization and to compare the differences between 2 modes of providing tele-lactation services on breastfeeding knowledge, breastfeeding intention, perceived social support, and 3-mo breastfeeding continuation behavior.	Population: postpartum women aged > 18 y. Sample: 43	Mixed methods, longitudinal pilot study (pre/post-intervention survey)	Tele-lactation services between telephone-only group and audio-visual intervention group.	-	Duration of intervention: 3 mo Outcomes measured: Breastfeeding Knowledge (BF): 5 existing 101 self-assessment question from a BF education module Infant feeding intention: Infant feeding intention scale questionnaire by Nommsen-Rivers and Dewey [29] Perceived social support: 19 item Social Support Survey developed and validated by Sherbourne and Stewart [30]. Prenatal care experiences and breastfeeding behaviors: self-reported prenatal care experiences and BF behaviors questions adapted from the PRAMS questionnaires (Shulman et al. [31]). BF continuation behavior: A binary outcome evaluated in a telephone call to participants within the 3 mo of follow-up.	We found that both telephone-only and audiovisual delivery of tele-lactation services were equally effective. At 3 mo after discharge, both groups reported continued BF (telephone-only: $n = 17$ ; 81%; audiovisual: $n = 18$ ; 90%) with no significant difference between the 2 groups ( $P = 0.663$ ). Additionally, no group differences were found for BF knowledge or perceived social support.

BF, breastfeeding; BMS, Breastfeeding Motivation Scale; BSES-SF, Breastfeeding Self-Efficacy Scale-Short Form; IBCLC, International Board of Lactation Consultant; IIFAS, Iowa Infant Feeding Attitude scale; NPRS, Numeric Pain Rating Scale; PRAMS, Pregnancy Risk Assessment Monitoring System; RCT, randomized controlled trial; SoC, standard of care; TPB, Theory of Planned Behavior

**Table 2**  
The component IYCF educational model in eligible studies

The IYCF component	Wong et al. (2023) [17]	Rachmah, et al. (2023) [18]	Baransel et al. (2022) [19]	Wulandari et al. (2021) [20]	Peiris et al. (2023) [21]	Fan et al. (2023) [22]	Bogulski et al. (2023) [23]
Early initiation breastfeeding				V			
Exclusive breastfeeding	V	V	V	V	V	V	V
Complementary feeding		V					
Continued breast-feeding							

IYCF, infant and young child feeding

The results of the IYCF intervention in this scoping review showed that, for the most part, there were no significant differences in the interventions given to the experimental and control groups. Additional larger studies with a long-term follow-up are needed to confirm effectiveness [17,21–23]. Meanwhile, studies whose results significantly affected the outcome in the intervention group were related to the research design used: the number of samples was quite large, and the material provided to respondents could be studied for discussion within the groups [18–20]. All intervention studies in this review could only be alternatives when delivering in-person behavior change programs was difficult because of pandemic-related lockdowns [51]. No consideration was given to whether the educational programs could still be used after the pandemic. The current scientific focus on effective and available science-based applications should be maintained to ensure effective implementation of these public health interventions in their respective environments [52]. In the future, these discussions will also examine ways of supporting the continuation of good practices while maximizing scarce resources and ensuring that longer-term results are achieved regarding priority public health concerns and outcomes. Community support must be maintained to uphold the importance of ethical research standards for marginalized populations [53].

Additionally, none of the interventions in this study were embedded within government programs related to IYCF. The research focused on innovations suggested to policymakers for adoption in the wider community.

### Limitations

This review was limited to 4 of 17 IYCF accessing indicators components. Furthermore, the scope of the review was carried out between January 2020 to January 2023; later time periods may have included new studies on IYCF interventions. Studies published in languages other than English were excluded.

### Conclusions

This scoping review identified and mapped the IYCF intervention models. The findings demonstrated that most IYCF educational models in the pandemic comprised online education, and WhatsApp was the most typical media used. The interventions were mostly done on the initiation of breastfeeding and exclusive breastfeeding rather than complementary and continued breastfeeding. These results help support and direct future educational models after the pandemic. Furthermore, the results of this scoping study can be implemented during a crisis, and future researchers may apply these evidence-based findings to design research on a larger scale and for a longer period, especially on complementary feeding and continued breastfeeding based on IYCF indicators UNICEF 2021.

### Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing

interests: There are no additional relationships or activities to declare.

### Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:[10.1016/j.nut.2023.112150](https://doi.org/10.1016/j.nut.2023.112150).

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