

Interventions to Improve Infant and Young Child Feeding Practices in Ethiopia: A Systematic Review

Kedir Yimam Ahmed (✉ kediryamam331@gmail.com)

College of Medicine and Health Sciences, Samara University, Samara, Ethiopia. 2 Translational Health Research Institute, Western Sydney University, Campbelltown Campus, NSW, Australia <https://orcid.org/0000-0003-3797-5234>

Kingsley E. Agho

Western Sydney University - Campbelltown Campus

Andrew Page

Western Sydney University - Campbelltown Campus

Amit Arora

Western Sydney University - Campbelltown Campus

Felix Ogbo

Western Sydney University - Campbelltown Campus

Research article

Keywords: Infant and young child feeding, breastfeeding, nutritional education, intervention, systematic review, Ethiopia

Posted Date: August 25th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-56786/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Background: Detailed understanding of the specific types of interventions that can be implemented to increase infant and young child feeding (IYCF) is essential to improve child health and development. In Ethiopia, despite the implementation of several interventions to improve IYCF practices, no published studies have highlighted the most effective IYCF interventions in the country. This systematic review investigated the impacts of various interventions on IYCF in Ethiopia.

Methods: A systematic search was conducted on seven computerized bibliographic databases (Embase, ProQuest Central, Scopus, PsycINFO, Web of Science, MEDLINE/PubMed and CINAHL) to locate experimental or quasi-experimental studies. Interventional studies that measured IYCF indicators (early initiation of breastfeeding [EIBF], exclusive breastfeeding [EBF], the introduction of complementary foods, minimum dietary diversity [MDD], minimum meal frequency [MMF] and minimum acceptable diet [MAD]) as outcome variables were included.

Results: Of the thirteen eligible studies, ten studies were quasi-experimental and three studies were cluster randomised trials. Five studies showed that interventions in the form of policy advocacy, health service strengthening, interpersonal communication, community mobilisation, and mass media campaigns improved EBF. Four studies indicated that community-level and health facility breastfeeding promotions increased EIBF. Three studies for MDD and two studies for MMF indicated significant effects of policy advocacy, interpersonal communication, community mobilisation, and mass media campaigns on infants and young children. Interventions that were delivered in combination increased the impacts in improving EIBF, MDD and MMF compared to single intervention.

Conclusion: Our review showed that a combination of community-level interventions improved EIBF, EBF, MDD, and MMF in Ethiopia. The improvement in IYCF in Ethiopia would require multi-prong approaches at the household and community levels along the continuum of care from conception until a child's second birthday.

Background

Appropriate infant and young child feeding (IYCF) improves childhood growth (through reduced risk of diarrhoea and respiratory infections as well as improved nutrition) [1–7], increases the intellectual capacity of children [4, 8], and reduces the risk of mothers to experience diabetes mellitus, overweight and obesity [4, 9]. Promoting appropriate IYCF using evidence-based interventions is essential to protect and support maternal knowledge, beliefs, and confidence in IYCF practices [10–13]. Community- and facility-based interventions that range from direct support and education to mothers and families on appropriate IYCF behaviours to training of health professionals can significantly improve IYCF behaviours [14–16].

Global efforts to improve maternal IYCF behaviours have increased in the past three decades. These efforts included the International Code of Marketing of Breast-milk Substitutes [17]; the Innocenti Declaration [18]; the Baby-Friendly Hospital Initiative (BFHI) [19]; the Millennium Development Goals (MDGs) [20]; and more recently, the Global Nutrition Targets 2025 [21] and the Sustainable Development Goals (SDGs) [22]. The World Health Organization and United Nations Children's Fund (WHO/UNICEF) have played major roles in driving these initiatives which aimed to protect, promote, and support breastfeeding and child nutrition [19]. For example, the WHO Global Nutrition Targets (WHO GNT, including Target– 1 and 5) aim to reduce the global number of stunted children under-5 by at least 40% and increase the EBF rate to at least 50% by the year 2025, respectively. However, most subnational areas of many African countries (including Ethiopia) are not on track to achieve WHO GNT goal– 5 [23].

In Ethiopia, while both government and non-governmental organisations have implemented various maternal and child health-related policy interventions over the last two decades to increase infant feeding [24–26], a recent study has revealed that early initiation of breastfeeding (EIBF) prevalence was 75.5% and that for exclusive breastfeeding (EBF) was 59.9% [27], with a wide heterogeneity across subnational areas of the country [23]. These rates are well below the Ethiopian Health Sector Transformation Plan (HSTP) target of 90% and 72%, respectively [25]. Additionally, the proportion of children who met minimum dietary diversity (MDD) and minimum meal frequency (MMF) was 7.1% and 43.6%, respectively [28]. In Ethiopia, more than five million children were stunted in 2016 [29], and this is a major public health issue that is largely attributable to inappropriate IYCF.

To date, no previously published studies have examined the most effective IYCF interventions in the Ethiopian context. A detailed understanding of the specific types of interventions that can be implemented to improve IYCF in Ethiopia is essential, to specifically guide the allocation of scarce resources and the provision of targeted strategies to increase childhood feeding. This information will also be helpful in scaling-up and/or improve upon current and future IYCF interventions in the country. Data from the assessment of relevant IYCF interventions would be crucial to stakeholders as Ethiopia implements national nutrition efforts (e.g., HSTP) [25] and global health programs such as the Sustainable Development Goal, SDG-2.2, to end all forms of malnutrition [22]. Accordingly, this systematic review investigated the impacts of various IYCF interventions on Ethiopian children under two years of age.

Materials And Methods

Our review adhered to the 2009 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [30], and the protocol for the review was registered in PROSPERO (International Prospective Register of Systematic Reviews, CRD42020155519) [Additional file 1] [31].

Information sources and search strategy

Consistent with previously published systematic reviews [15, 32], a three-stage search strategy was applied to locate both published and unpublished studies. In stage one, a manual search of previously published systematic reviews and the reference lists of all the eligible studies was performed to check for systematic reviews of interventions on IYCF in Ethiopia. In stage two, index terms (e.g., medical subject headings [MeSH] for Medline) and key terms were

generated using the identified articles from the initial search for the full search strategy. In stage three, a full search strategy was conducted on seven computerized bibliographic databases (Embase, ProQuest Central, Scopus, PsycINFO, Web of Science, MEDLINE [OVID]/PubMed and Cumulative Index to Nursing and Allied Health Literature, CINAHL) (EBSCO) to locate published studies, and secondary searching of OpenGrey and Grey Literature Report was conducted to locate unpublished works. The Population Intervention Comparator Outcome (PICO) criteria were used to devise the review question and related search terms. A combination of specified medical subject headings (MeSH) terms and keywords was drafted with some assistance from our institution-based medical librarian. The search strategy, including all identified index and keywords terms, was slightly adapted for each of the information sources. The initial and the top-up searches were conducted in November 2019, and June 2020, respectively. The search terms/keywords used included:

Term 1 (participants): Child OR infant OR female OR caregiver OR women OR community health workers OR health extension worker AND

Term 2 (feeding): Breastfeed OR infant food OR meals OR diet OR feeding behaviour OR healthy diet OR child nutritional physiological phenomena AND

Term 3 (interventions): child health services OR counselling OR dietary supplements OR health education OR food supply OR health promotion OR prenatal care OR postnatal care OR early intervention OR community health planning OR models/educational OR impact OR influence OR effect AND

Term 4 (context): Ethiopia

Eligibility criteria

Studies were included if they meet the following criteria: (i) experimental or quasi-experimental study design (including randomized controlled trials [RCT], non-RCTs, before and after studies, and interrupted time-series studies) with or without comparison groups or cluster; (ii) conducted among pregnant women and mothers living with live children under 2 years to improve IYCF practices; (iii) used any type of IYCF interventions delivered between the antenatal period and 24 months postpartum; (iv) measured at least one core IYCF indicators such as EIBF, EBF, the introduction of solid, semi-solid and soft foods, continued breastfeeding at one year, MDD, MMF, and minimum acceptable diet (MAD); (v) were published in the English language; and (vi) conducted in Ethiopia from the year 2000 to date. We considered studies published over this period to demonstrate the impacts of the specific IYCF interventions in the context of Ethiopia to reflect the implementation of relevant global health programs, including the MDGs and the current SDGs [23].

The intervention strategies considered in this review focused on those performed in both facility- and community-levels. The interventions included nutritional education and counselling, interpersonal communication, mass media campaigns, nutrition-sensitive agricultural activities, group demonstration sessions, and strengthening of health facilities.

Studies conducted among mothers with health problems such as HIV/AIDS and children with cleft palate were excluded.

The IYCF practices included EIBF, EBF, the introduction of solid, semi-solid and soft foods, continued breastfeeding at one year, MDD, MMF, and MAD, measured according to the WHO definitions for assessing IYCF indicators [33]. These indicators were selected based on their effect on the health and development of infants and young children [11, 12, 35] and the evidence from previously published systematic reviews [11, 34].

- EIBF was defined as the proportion of children aged 0–23 months who commenced breastfeeding within the first hour of birth.
- EBF was defined as the proportion of infants 0–5 months of age who were fed no other food or drink, not even water, except breast milk (including milk expressed or from a wet nurse), but allows the infant to receive Oral Rehydration Salt (ORS), drops, and syrups (vitamins, minerals, and medicines).
- Continued breastfeeding at one year was defined as the proportion of children 12–15 months of age who are fed breast milk.
- Introduction of complementary foods (solid, semi-solid and soft foods) was defined as the proportion of infants 6–8 months of age who received solid, semi-solid or soft foods in the previous 24 hours, during the day and at night.
- MDD was defined as the proportion of children 6–23 months of age who received foods from four or more of the seven food groups. The seven food groups included grains, roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables.
- MMF defined as the proportion of breastfed and non-breastfed children 6–23 months of age, who received solid, semisolid or soft foods (including milk feeds for non-breastfed children) the minimum number of times or more (i.e., two times for breastfed infants aged 6–8 months, three times for breastfed children aged 9–23 months and four times for non-breastfed children aged 6–23 months, on the previous day).
- MAD defined as the proportion of children 6–23 months of age who received both minimum dietary diversity and minimum meal frequency.

Study selection

Following the full search, all articles retrieved from the search databases were exported to the EndNote X9 (Clarivate Analytics, USA) for removing duplicates, screening, and selection. Titles and abstracts were screened by two reviewers (KYA and FAO) independently for assessment against the inclusion criteria. Potentially relevant articles that were selected in the first screening phase were retrieved in full and their citation details imported into the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). The full text of the included studies read and checked by two independent reviewers (KYA and FAO) against the eligibility criteria. Studies that did not meet the eligibility criteria were excluded and the reasons for exclusion of studies recorded and reported in the systematic review. Any disagreements between the two independent reviewers were resolved by consensus and arbitration by the third (KEA) author of the review. For studies with uncertainties regarding the eligibility, the authors were contacted to seek additional information. A total of two contact attempts were made, and if no response was received, the articles were screened for eligibility based on the information available. The results of the study selection process are presented in a PRISMA flow diagram (Fig. 1).

Data collection process and data items

Relevant data were extracted from the eligible studies by KYA, and independently verified by FAO using piloted forms adapted from the Joanna Briggs Institute (JBI) reviewer's manual [35] and the Cochrane Pregnancy and Childbirth Group for Systematic Reviews [36]. Eligible studies were identified using the following information: first author, publication year, study design and setting, study participants, sample size, geographical region, intervention components, location of intervention delivery, outcome measures, statistical analysis, and results. Corresponding authors of eligible studies were contacted for information that was not clear in the data extraction. A total of two contact attempts were made, and if no response was received, only the information available was used.

Risk of bias Assessment

All included studies examined for the five types of biases of interventional studies: (i) selection bias; (ii) performance bias; (iii) attrition bias; (iv) detection bias and; (v) reporting bias. KYA and KEA independently conducted the risk of bias assessment using the revised Cochrane risk of bias tool for clustered randomized trials (ROB 2.0) [37, 38] and the risk of bias in non-randomised studies - of interventions (ROBINS-I) tool [39] for assessing the risk of bias in quasi-experimental studies. Cluster randomised trials were assessed for five domains (i.e., randomization and identification or recruitment bias, deviations from intended interventions, missing data, measurement of outcomes, and selection of reported result), and quasi-experimental studies were assessed for seven domains (i.e., confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of reported result). For cluster randomised trials, the overall risk of bias judgement included low risk, some concerns and high risk [37, 38], and for the quasi-experimental studies, the overall risk of bias outcome included low, moderate, serious, and critical risk of bias [39]. There was no disagreement between reviewers in the risk of bias assessment, no third arbitrator was needed.

Data synthesis

Author reports of effect size measures were used in reporting the findings of each study. Effect size measures included a comparison between experimental and control groups (e.g., odds ratio [OR]), as well as the difference in proportion between pre- and post-outcome measures (e.g., change in proportion). Where available, 95% confidence interval (CI) and P-value were obtained from the eligible studies. Narrative methods including text, table, and figure were also used as a tool for data presentation.

Results

Characteristics of eligible studies

A total of 1653 articles were found in the database and hand searching. Of these, 1021 were retained in Endnote library after removing duplicates. Titles and abstracts of the articles were screened, and 996 articles were removed. Full-text eligibility checks of the remaining 25 articles excluded 12 studies. The reasons for exclusion of studies included: 2 studies were duplicates [41, 42], 1 study was cross-sectional [43, 44], 2 studies were based on interventions designed for reproductive-age women [45, 46], 1 study used qualitative evaluation [47], 4 studies were abstracts [48–51], and 1 study designed for under-five children [52] (Fig. 1).

Among the 13 included studies, ten were quasi-experimental studies [53–62], while the remaining three were cluster randomized trials [63–65]. At least one interventional study was conducted in Sothorn Nations Nationalities and Peoples' Region (SNNPR) [56–58, 60, 61, 65], Oromia [53, 56, 57, 62, 66], Amhara [55–57, 64], Tigray [56, 58], and Afar [59] regions, but we did not find published interventional study conducted in Addis Ababa and Dire Dawa city administrations, as well as Harari, Benishangu1, Gambella, or Somali regions.

Risk Of Bias In Included Studies

Additional file 2 and 3 presents the risk of bias assessment of the included studies. Three cluster randomised trials were assessed for risk of bias using the Cochrane RoB 2.0 tool. Overall, studies by Kang et al and Tariku et al judged as some concerns in the risk of bias [63, 65], and the remaining study by Kim et al had a low risk of bias [64]. All cluster randomised trials had a low risk of bias in randomisation, missing data, and reporting of results. Out of ten quasi-experimental studies assessed using the ROBINS-1 tool, six studies had a serious risk of bias [53, 56, 57, 60–62], and two studies had a moderate risk of bias [58, 59]. The remaining two studies judged as critical risk of bias [54, 55]. Seven out of ten studies had a serious or critical risk of bias in confounder adjustment [53–57, 60–62], while five out of ten studies had a low risk of bias in outcome measurement and selection of reported result [56–60]

Evidence from reviewed studies

In the eligible studies, the majority of the interventions were provided in the form of behaviour change communication (BCC) using nutrition education [60, 61], community mobilisation [55, 57, 64], health education materials [53, 59, 61, 62], and mass media communication [58, 64]. Other interventions were also provided in the form of strengthening of health care system [57, 59], training and supervision of health care providers [55, 57, 62], and food preparation and demonstration sessions [60, 61, 63]. Additionally, two studies used the health belief model (HBM) as a mode of intervention delivery for BCC [60, 65].

Seven studies used control groups for comparison with experimental groups [57, 59–62, 64, 65], while six studies did not use a control or comparison group [53–56, 58, 63]. One study included two experimental arms (HBM and traditional intervention groups) as an intervention group [65].

Impact of interventions on IYCF practices in Ethiopia

EIBF

Four studies reported the effect of interventions to improve EIBF [55, 56, 58, 59]. A health facility level intervention in the Afar region that integrated nutrition information into health professional guidelines, and also provided family education and counselling booklets resulted in a significant improvement in EIBF in the experimental group compared to the control group (OR = 1.70; 95% CI: 1.17, 2.46) [59]. Kim et al. showed that interventions delivered through advocacy and policy dialogues, interpersonal communication and community mobilization, and mass communication improved EIBF [58]. This study also showed that the association between exposure to two or more types of interventions and improvement in EIBF was stronger compared to exposure to a single type of intervention (AOR = 2.07; 95% CI: 1.09, 3.91 for multiple intervention vs AOR = 1.88; 95% CI: 1.08, 3.27 for single intervention) [58]. Buchanan et al. [55] and Baxter et al. [56] found an increase in the proportions of EIBF (from 31.0–77.0% and 51.4–67.9%, respectively), following the implementation of BCC and community-level breastfeeding promotions.

EBF

Eight studies reported the effect of interventions on EBF in Ethiopia. Of these, seven studies measured EBF for up to six months, while one study measured EBF for up to one month. Villadsen et al. found that antenatal care strengthening for pregnant women significantly improved EBF in health facilities under intervention compared to health facilities without intervention (OR = 2.30; 95% CI: 1.4, 3.6) [59, 62].

Integrating nutrition into the health workers' guidelines, and providing family education and counselling booklet (OR = 2.62; 95% CI: 0.07, 10.3) [59] and exposure to BCC intervention (i.e., advocacy and policy dialogues, interpersonal communication and community mobilization, and mass communication) did not affect EBF behaviours [58]. Five studies showed that there were increases in EBF during the intervention period [53–57], but out of these studies, two indicated that improvements in EBF were not statistically significant [53, 57].

Introduction of solid, semi-solid and soft foods

Kim et al. investigated the effect of exposure to BCC interventions (advocacy and policy dialogues, interpersonal communication and community mobilization, and mass communication) on the introduction of solid, semi-solid and soft foods in two separate arms. The first arm of the study found an increase in the proportion of infants who were introduced to solid, semi-solid and soft foods (from 37.4–59.7%, P-value < 0.001) [58]. In contrast, the second arm of the study did not find a significant improvement (from 58.7–61.3%, P-value > 0.05) [64].

Continued breastfeeding at one year

Only one study measured the impact of interventions on continued breastfeeding at one year. Tariku et al. showed that IYCF messages using the health belief model (HBM) did not impact continued breastfeeding rate at one year [65].

Minimum dietary diversity

Five studies reported the effect of interventions on MDD. Of these, three measured according to the WHO definitions for MDD [58, 64, 65], while the remaining two studies used any four food groups as a cut-off point to measure MDD [61, 63]. Two studies by Kim et al. revealed the significant impacts of exposure to more than one type of BCC interventions (advocacy and policy dialogues, interpersonal communication and community mobilization, and mass communication) on MDD, but these studies showed that exposure to a single type of intervention did not have an impact on MDD [58, 64]. Tariku et al. showed interventions involving complementary feeding messages using the HBM model significantly increased the proportion of MDD (from 37.5–67.9%, P-value < 0.05) [65]. The remaining two studies indicated that the proportion of MDD increased over the intervention period, but the effect was not significant [61, 63].

Minimum meal frequency

MMF was included as an outcome variable in six interventional studies. Two studies used the WHO definitions assessing for MMF [58, 64]. Kim et al. 2019 indicated that exposure to two types of BCC interventions (advocacy and policy dialogues, interpersonal communication and community mobilization, and mass communication) had a significant effect on MMF of infants and young children compared to those who did not expose to intervention (OR = 1.69; 95% CI: 1.13, 2.52) [64]. Carnell et al. found that interventions using a community-based participatory nutrition program significantly increased the proportion of MMF over the intervention period [63]. Except for one study, which did not do a significant test [61], the remaining two studies did not show significant increases in MMF [60, 65].

Discussion

A total of thirteen studies were included, and of these, ten were quasi-experimental studies, and three were cluster randomised trials. Five studies for EBF and four studies for EIBF showed that community- and facility-based interventions delivered in the form of BCC (such as policy advocacy, interpersonal communication, community mobilisation, and mass media campaigns) and health service strengthening had an impact on infants. Three studies for MDD and two studies for MMF indicated significant effects of BCC on infants and young children. Two eligible studies showed that combined interventions delivered in the form of interpersonal communication, nutrition-sensitive agricultural activities, community mobilisation, and mass media campaigns had more impacts on EIBF, MDD, and MMF.

Global evidence indicates that BCC interventions (including policy advocacy, interpersonal communication, community mobilisation and mass media campaigns) are essential in promoting IYCF practices. These initiatives also create a supportive environment that helps mothers to adopt and sustain positive child feeding behaviours [11, 67]. The main goals of BCC intervention include improving behaviours of a facility- and community-level health

workers, mothers and other caregivers, and members of their households [11, 67]. Our review showed that BCC interventions in the form of policy advocacy, interpersonal communication, community mobilisation, and mass media campaigns improved EIBF, EBF, MDD and MMF. Our finding is consistent with systematic reviews from LMICs, which indicated that group nutritional education and counselling, family or social support, integrated mass media coverage, and community mobilization were effective in improving IYCF practices [11, 68]. Although BCC interventions promote skills and knowledge that are necessary for improving IYCF practices, achieving the intended target is often challenging without complementary interventions that provide or facilitate material inputs [67]. Our review suggests that interventions that promote material inputs (such as cash transfer and provision of food materials) and/or non-material inputs (skills and knowledge) are required in achieving appropriate and sustained IYCF behaviours.

Research has shown that exposure to more than one IYCF interventions, delivered through different platforms (e.g., community- or facility-based), were more successful in improving IYCF outcomes compared to a single form of intervention delivered at a single setting [5]. Our review indicated that exposure to more than two types of interventions was associated with improvement in EIBF, MDD, and MMF [58, 64]. This result may be due to that intervention delivered through multiple settings may have an increased intensity that can be translated to behavioural changes due to repeated contacts and adequate coverage of interventions [69]. Our review suggests that interventions that aim to improve IYCF behaviours in Ethiopia should be delivered through different and specific types of contexts (including household, health facility and community) and should be provided along the continuum of care from conception until a child's second birthday.

In the past two decades, the Ethiopian government's commitment to improve IYCF has been consistent, and this started with the development of the National Strategy for IYCF in 2004 and followed by National Strategy for Nutrition in 2008 [24, 70], in line with the WHO/UNICEF IYCF strategy [71]. In 2015, the Ethiopian government launched the Health Sector Transformation Plan to improve health outcomes, including IYCF practices [30]. Based on this initiative, many facility- and community-based interventions have been implemented to protect, promote and support appropriate IYCF behaviours [10, 11]. Nevertheless, our review found that there has been no formal IYCF intervention conducted in Addis Ababa and Dire Dawa city administrations, and Harari, Benishangu1, Gambella, and Somali regions. Our review suggests an expansion of additional experimental studies to maximise the opportunities for the prevention of IYCF-related morbidity and mortality in those regions.

Additionally, our review did not find any studies which incorporated the use of mobile health (mHealth) as part of an intervention package for improving IYCF [72]. Future experimental studies that consider the use of mHealth techniques are required, especially that previously published studies have shown the positive impacts of interventions (in form of voice messages, SMS, and phone calls) on IYCF practices [73–75]. Finally, interventional studies that consider the role of fathers/partners as well as grandmothers in improving IYCF behaviours may be warranted in Ethiopia [76–78].

The present systematic review of IYCF outcomes from interventions has strengths and limitations. First, a meta-analysis was not conducted due to the wide heterogeneity of the design and outcome measures. Second, this review was limited by the incompleteness of information from the individual studies. Nevertheless, the study authors were contacted for information when it is necessary. Third, our search was limited to published studies in English, which exclude studies published with other languages. Fourth, lack of evidence and under-representation of some regions may limit the generalizability of our review. However, evidence from this review is potentially relevant for IYCF policy efforts in Ethiopia. Despite the above limitations, the application of multiple search strategies in consultation with the medical librarian and registration of the systematic review protocol can be considered as strengths of this review.

Conclusion

Our systematic review showed that interventions delivered in the form of policy advocacy, health service strengthening, interpersonal communication, community mobilisation, and mass media campaigns improved EIBF, EBF, MDD, and MMF in Ethiopia. The impacts of current and/or future interventions on IYCF practices in Ethiopia will be greater when interventions are combined, introduced and implemented along the continuum of care from conception until a child's second birthday.

Abbreviations

ANC

Antenatal Care; OR:Odds Ratio; BFHI:Baby-Friendly Hospital Initiative; CI:Confidence Interval; EBF:Exclusive Breastfeeding; EIBF:Early Initiation of Breastfeeding; HBM:Health Belief Model; HSTP:Health Sector Transformation Plan; IYCF:Infant and Young Child Feeding; JBI:Joanna Briggs Institute; LMICs:Lower and Middle-Income Countries; MAD:Minimum Acceptable Diet; MDD:Minimum Dietary Diversity; MeSH:Medical Subject Headings; MDG:Millennium Development Goal; MMF:Minimum Meal Frequency; Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA); RCTs:Randomised Controlled Trials; SDGs:Sustainable Development Goals; SNNPR:Southern Nations Nationalities and Peoples Regions; SUMARI:System for the Unified Management, Assessment and Review of Information; UNICEF:United Nation Children's Fund; WHO:World Health Organization

Declarations

Ethics approval and consent to participate

"Not applicable"

Consent for publications

“Not applicable”

Availability of data and materials

“Not applicable”

Competing interests

The authors declare that they have no competing interests

Funding

This study received no grant from any funding agency in public, commercial or not for profit sectors

Authors' contributions

KYA conceptualised the study idea, performed the literature searching, selected the paper of interests, performed data extraction, and critically revised the manuscript. AP and AA critically revised the manuscript for intellectual content. KEA performed the risk of bias assessment, and critically revised the manuscript. FAO contributed to the conception of the research idea, selected the paper of interests, performed data extraction, and critically revised the manuscript. All authors read and approved the final manuscript.

Acknowledgments

The authors are grateful to Lily Collison (Medical Librarian at Western Sydney University) for help in designing the search strategy.

GloMACH members are Kingsley E. Agho, Felix Akpojene Ogbo, Kedir Yimam Ahmed, Thierno Diallo, Osita E Ezech, Osuagwu L Uchechukwu, Pramesh R. Ghimire, Blessing Jaka Akombi, Pascal Ogeleka, Tanvir Abir, Abukari I. Issaka, Abdon Gregory Rwabilimbo, Daarwin Subramanee, Nilu Nagdev and Mansi Dhami

References

1. Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, Ezzati M, Grantham-McGregor S, Katz J, Martorell R, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382(9890):427–51.
2. Shrimpton R, Victora CG, de Onis M, Lima RC, Blossner M, Clugston G. Worldwide timing of growth faltering: implications for nutritional interventions. *Pediatrics*. 2001;107(5):E75.
3. WHO. **Infant and young child feeding: Model Chapter for textbooks for medical students and allied health professionals**. In. Geneva, Switzerland: WHO; 2009.
4. Victora CG, Bahl R, Barros AJ, Franca GV, Horton S, Krasevec J, Murch S, Sankar MJ, Walker N, Rollins NC. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet*. 2016;387(10017):475–90.
5. Sinha B, Chowdhury R, Sankar MJ, Martinez J, Taneja S, Mazumder S, Rollins N, Bahl R, Bhandari N. Interventions to improve breastfeeding outcomes: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):114–34.
6. Ahmed KY, Page A, Arora A, Ogbo FA, Global M. Child Health Research c: **Associations between infant and young child feeding practices and acute respiratory infection and diarrhoea in Ethiopia: A propensity score matching approach**. *PLoS One*. 2020;15(4):e0230978.
7. Ogbo FA, Agho K, Ogeleka P, Woolfenden S, Page A, Eastwood J. Infant feeding practices and diarrhoea in sub-Saharan African countries with high diarrhoea mortality. *PLoS One*. 2017;12(2):e0171792.
8. Lee H, Park H, Ha E, Hong Y-C, Ha M, Park H, Kim B-N, Lee B, Lee S-J, Lee KY, et al. Effect of Breastfeeding Duration on Cognitive Development in Infants: 3-Year Follow-up Study. *J Korean Med Sci*. 2016;31(4):579–84.
9. Chowdhury R, Sinha B, Sankar MJ, Taneja S, Bhandari N, Rollins N, Bahl R, Martinez J. Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):96–113.
10. Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, Webb P, Lartey A, Black RE. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The Lancet*. 2013;382(9890):452–77.
11. Graziose MM, Downs SM, O'Brien Q, Fanzo J. Systematic review of the design, implementation and effectiveness of mass media and nutrition education interventions for infant and young child feeding. *Public Health Nutr*. 2018;21(2):273–87.
12. Fabrizio CS, van Liere M, Pelto G. **Identifying determinants of effective complementary feeding behaviour change interventions in developing countries**. 2014, 10(4):575–592.
13. Lassi ZS, Rind F, Irfan O, Hadi R, Das JK, Bhutta ZA. Impact of Infant and Young Child Feeding (IYCF) Nutrition Interventions on Breastfeeding Practices, Growth and Mortality in Low- and Middle-Income Countries: Systematic Review. *Nutrients*. 2020;12(3):722.

14. Shi L, Zhang J. Recent Evidence of the Effectiveness of Educational Interventions for Improving Complementary Feeding Practices in Developing Countries. *J Trop Pediatr*. 2010;57(2):91–8.
15. Tilahun D, Birhanu Z. Effect of community based behavioural change communication intervention to improve neonatal mortality in developing countries: A Systematic Review. *JBI library of systematic reviews*. 2011;9(40):1650–78.
16. Lumbiganon P, Martis R, Laopaiboon M, Festin MR, Ho JJ, Hakimi M. **Antenatal breastfeeding education for increasing breastfeeding duration**. *Cochrane Database Syst Rev* 2016(12).
17. WHO. **International Code of Marketing of Breast-milk Substitutes**. In. Geneva, Switzerland; 1981.
18. WHO/UNICEF. **Innocenti declaration: On the protection, promotion and support of breastfeeding** In. Florence, Italy; 1990.
19. **Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services Guideline** [<https://www.who.int/nutrition/publications/guidelines/breastfeeding-facilities-maternity-newborn/en/>].
20. **Millennium development goals and beyond 2015** <https://www.un.org/millenniumgoals/>.
21. **Global targets. 2025: to improve maternal, infant and young child nutrition** [<https://www.who.int/nutrition/global-target-2025/en/>].
22. SDG-UN. Transforming our world: The 2030 agenda for sustainable development. In. New York: UN; 2015.
23. Bhattacharjee NV, Schaeffer LE, Marczak LB, Ross JM, Swartz SJ, Albright J, Gardner WM, Shields C, Sligar A, Schipp MF, et al. Mapping exclusive breastfeeding in Africa between 2000 and 2017. *Nat Med*. 2019;25(8):1205–12.
24. Ethiopian Federal Ministry of Health. **National strategy for infant and young child feeding**. In. Addis Ababa, Ethiopia: Ethiopian Federal Ministry of Health; 2004.
25. Ethiopian Federal Ministry of Health. Health sector transformation plan: 2015/16–2019/20 (2008–2012 EFY). In: In. Addis Ababa. Ethiopia: Ethiopian Federal Ministry of Health; 2015.
26. Family health department FMoH. **National strategy for child survival in Ethiopia** In. Addis Ababa, Ethiopia; 2005.
27. Ahmed KY, Page A, Arora A, Ogbo FA: **Trends and determinants of early initiation of breastfeeding and exclusive breastfeeding in Ethiopia from 2000 to 2016**. *Int Breastfeed J* 2019, **14**(1):40.
28. Ahmed KY, Page A, Arora A, Ogbo FA: **Trends and factors associated with complementary feeding practices in Ethiopia from 2005 to 2016**. [n/a\(n/a\):e12926](https://doi.org/10.1186/s12926-019-0129-2).
29. **Ethiopia: nutrition Profile** [<https://-Mar2018-508.pdf>].
30. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Group P-P: **Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement**. *Systematic reviews*. 2015;4(1):1.
31. **Effectiveness of infant and young child feeding interventions in Ethiopia: a systematic review and meta-analysis** [https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020155519].
32. Dol J, Richardson B, Tomblin Murphy G, Aston M, McMillan D, Campbell-Yeo M. **Impact of mobile health (mHealth) interventions during the perinatal period for mothers in low- and middle-income countries: a systematic review**. *JBI Evidence Synthesis* 2019, **17**(8).
33. WHO. UNICEF: **Indicators for assessing infant and young child feeding practices Part 1 Definitions**. In., edn.; 2008.
34. Manikam L, Sharmila A, Dharmaratnam A, Alexander EC, Kuah JY, Prasad A, Ahmed S, Lingam R, Lakhanpaul M. Systematic review of infant and young child complementary feeding practices in South Asian families: the Pakistan perspective. *Public Health Nutr*. 2018;21(4):655–68.
35. **Joanna Briggs Institute Reviewers' Manual** [<https://wiki.joannabriggs.org/display/MANUAL/JBI+Reviewer%27s+Manual>].
36. **Cochrane handbook for systematic reviews of interventions** [<https://pregnancy.cochrane.org/author-resources-new-reviews>].
37. Higgins JP, Green S, editors. *Cochrane handbook for systematic reviews of interventions*. In. London: A John Wiley & Sons, Ltd., Publication;; 2011.
38. Eldridge S, Campbell M, Campbell M, Dahota A, Giraudeau B, Higgins J, Barney Reeves, Siegfried N: **Revised Cochrane risk of bias tool for randomized trials (rob 2.0): Additional considerations for cluster-randomized trials**. In.; 2016.
39. Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, Henry D, Altman DG, Ansari MT, Boutron I, et al: **ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions**. 2016, **355**:i4919.
40. Moher D, Liberati A, Tetzlaff J, Altman DG, The PG. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med*. 2009;6(7):e1000097.
41. Henry CJ, Zello GA: **A nutrition education intervention affects the diet-health related practices and nutritional status of mothers and children in a pulse-growing community in Halaba, south Ethiopia**. *FASEB Journal Conference: Experimental Biology* 2017, **31**(1 Supplement 1).
42. Kang Y, Sinamo S, Kim S, Christian P: **Effectiveness of a communitybased participatory nutrition promotion program to improve linear and ponderal growth in children 6 to 24 months of age in rural Eastern Ethiopia: A cluster randomized trial**. *FASEB Journal Conference: Experimental Biology* 2015, **29**(1 Meeting Abstracts).
43. Baye K, Retta N, Abuye C. Comparison of the effects of conditional food and cash transfers of the Ethiopian Productive Safety Net Program on household food security and dietary diversity in the face of rising food prices: ways forward for a more nutrition-sensitive program. *Food Nutr Bull*. 2014;35(3):289–95.
44. Kim SS, Nguyen PH, Tran LM, Alayon S, Menon P, Frongillo EA. **Different Combinations of Behavior Change Interventions and Frequencies of Interpersonal Contacts Are Associated with Infant and Young Child Feeding Practices in Bangladesh, Ethiopia, and Vietnam**. *Current developments in nutrition* 2019, **4**(2).

45. Diddana TZ, Kelkay GN, Dola AN, Sadore AA. Effect of Nutrition Education Based on Health Belief Model on Nutritional Knowledge and Dietary Practice of Pregnant Women in Dessie Town, Northeast Ethiopia: A Cluster Randomized Control Trial. *J Nutr Metab.* 2018;2018:6731815–5.
46. Berhanu G, Henry C, Green TJ. Effect of nutrition education to mothers on improved pulse consumption by young children aged 6–24 months in rural Sidama, South Ethiopia. *Ann Nutr Metab.* 2017;71(Supplement 2):1271.
47. Roche ML, Sako B, Osendarp SJ, Adish AA, Tolossa AL. **Community-based grain banks using local foods for improved infant and young child feeding in Ethiopia.** *Matern Child Nutr* 2017, 13(2).
48. Frongillo EA, Girma M: **Understanding the effect of Community-Based Health and Nutrition Program on uptake of iron and folic acid supplementation and breastfeeding practices in a pastoralist Community in rural Ethiopia.** *FASEB Journal Conference: Experimental Biology* 2017, 31(1 Supplement 1).
49. Kang Y, Seo EK, Kim J: **Maternal membership of community groups is associated with dietary diversity among children 6 to 12 months of age in rural Ethiopia.** *FASEB Journal Conference: Experimental Biology* 2016, 30(Meeting Abstracts).
50. Reider K, Mekonnen Y: **Effect of timed and targeted counseling (ttC) by peer mothers in changing infant and young child feeding practices among mothers of children 0 to 18 months in four districts in Southern Ethiopia.** *FASEB Journal Conference: Experimental Biology* 2013, 27(Meeting Abstracts).
51. Han YE, Park S, Kim JE, Kim H, Hoddinott J: **Father Engagement in Improving Infant and Young Child Feeding (IYCF) Practices: Evidence from a Clustered Randomized Controlled Trial in Ethiopia (P11-112-19).** *Current developments in nutrition* 2019, 3(Supplement_1).
52. Fenn B, Bulti AT, Nduna T, Duffield A, Watson F. An evaluation of an operations research project to reduce childhood stunting in a food-insecure area in Ethiopia. *Public Health Nutr.* 2012;15(9):1746–54.
53. Baxter JAB, Barac R, Davidson M, Salim L, Zlotkin S, Barwick M: **Evaluating programmatic effectiveness and implementation: An assessment of factors affecting change in the practice of exclusive breastfeeding in Ethiopia and mali.** *FASEB Journal Conference: Experimental Biology* 2016, 30(Meeting Abstracts).
54. Berti PR, Mildon A, Siekmans K, Main B, Macdonald C. An adequacy evaluation of a 10-year, four-country nutrition and health programme. *Int J Epidemiol.* 2010;39(2):613–29.
55. Buchanan SE, Pose B. Improving child survival through behavioral change and community engagement: The farta, ethiopia child survival project. *International Journal of Health Promotion Education.* 2012;50(3):145–58.
56. Callaghan-Koru JA, Estifanos AS, Sheferaw ED, de Graft-Johnson J, Rosado C, Patton-Molitors R, Worku B, Rawlins B, Baqui A: **Practice of skin-to-skin contact, exclusive breastfeeding and other newborn care interventions in Ethiopia following promotion by facility and community health workers: results from a prospective outcome evaluation.** *Acta paediatrica (Oslo, Norway: 1992)* 2016, 105(12):e568-e576.
57. Carnell MA, Dougherty L, Pomeroy AM, Karim AM, Mekonnen YM, Mulligan BE. Effectiveness of scaling up the 'three pillars' approach to accelerating MDG 4 progress in Ethiopia. *J Health Popul Nutr.* 2014;32(4):549–63.
58. Kim SS, Rawat R, Mwangi EM, Tesfaye R, Abebe Y, Baker J, Frongillo EA, Ruel MT, Menon P. Exposure to Large-Scale Social and Behavior Change Communication Interventions Is Associated with Improvements in Infant and Young Child Feeding Practices in Ethiopia. *PloS one.* 2016;11(10):e0164800.
59. Kung'u JK, Pendame R, Ndiaye MB, Gerbaba M, Ochola S, Faye A, Basnet S, Frongillo EA, Wuehler S, De-Regil LM: **Integrating nutrition into health systems at community level: Impact evaluation of the community-based maternal and neonatal health and nutrition projects in Ethiopia, Kenya, and Senegal.** *Matern Child Nutr* 2018, 14 Suppl 1.
60. Mulualem D, Henry CJ, Berhanu G, Whiting SJ. The effectiveness of nutrition education: Applying the Health Belief Model in child-feeding practices to use pulses for complementary feeding in Southern Ethiopia. *Ecology of food nutrition.* 2016;55(3):308–23.
61. Negash C, Belachew T, Henry CJ, Kebebe A, Abegaz K, Whiting SJ. Nutrition education and introduction of broad bean-based complementary food improves knowledge and dietary practices of caregivers and nutritional status of their young children in Hula, Ethiopia. *Food nutrition bulletin.* 2014;35(4):480–6.
62. Villadsen SF, Negussie D, GebreMariam A, Tilahun A, Girma T, Friis H, Rasch V. Antenatal care strengthening for improved health behaviours in Jimma, Ethiopia, 2009–2011: An effectiveness study. *Midwifery.* 2016;40:87–94.
63. Kang Y, Suh YK, Debele L, Juon HS, Christian P. Effects of a community-based nutrition promotion programme on child feeding and hygiene practices among caregivers in rural Eastern Ethiopia. *Public Health Nutr.* 2017;20(8):1461–72.
64. Kim SS, Nguyen PH, Yohannes Y, Abebe Y, Tharane M, Drummond E, Frongillo EA, Ruel MT, Menon P. Behavior Change Interventions Delivered through Interpersonal Communication, Agricultural Activities, Community Mobilization, and Mass Media Increase Complementary Feeding Practices and Reduce Child Stunting in Ethiopia. *J Nutr.* 2019;149(8):1470–81.
65. Tariku B, Whiting SJ, Mulualem D, Singh P. Application of the Health Belief Model to Teach Complementary Feeding Messages in Ethiopia. *Ecology of food nutrition.* 2015;54(5):572–82.
66. Kang Y, Kim S, Sinamo S, Christian P. **Effectiveness of a community-based nutrition programme to improve child growth in rural Ethiopia: a cluster randomized trial.** 2017, 13(1).
67. Warren AM, Frongillo EA, Nguyen PH, Menon P. Nutrition Intervention Using Behavioral Change Communication without Additional Material Inputs Increased Expenditures on Key Food Groups in Bangladesh. *The Journal of Nutrition.* 2020;150(5):1284–90.
68. Sinha B, Chowdhury R, Sankar MJ, Martines J, Taneja S, Mazumder S, Rollins N, Bahl R, Bhandari N. Interventions to improve breastfeeding outcomes: a systematic review and meta-analysis. *Acta Paediatr.* 2015;104(S467):114–34.
69. Sanghvi T, Seidel R, Baker J, Jimerson A. **Using behavior change approaches to improve complementary feeding practices.** 2017, 13(S2):e12406.

70. Health EFMo. **National nutrition strategy**. In.; 2008.
71. **Infant and young child feeding** [<https://www.who.int/en/news-room/fact-sheets/detail/infant-and-young-child-feeding>].
72. Patil S, Nimmagadda S, Gopalakrishnan L, Avula R, Bajaj S, Diamond-Smith N, Fernald L, Menon P, Walker D. Mobile Technology Integrated into a Large-Scale Nutrition Program Enables Age-Appropriate Home Visits and Counseling for Mothers of Infants in India. *Current developments in nutrition*. 2020;4(Supplement_2):886–6.
73. Flax VL, Negerie M, Ibrahim AU, Leatherman S, Daza EJ, Bentley ME. Integrating group counseling, cell phone messaging, and participant-generated songs and dramas into a microcredit program increases Nigerian women's adherence to international breastfeeding recommendations. *J Nutr*. 2014;144(7):1120–4.
74. Lee SH, Nurmatov UB, Nwaru BI, Mukherjee M, Grant L, Pagliari C. Effectiveness of mHealth interventions for maternal, newborn and child health in low- and middle-income countries: Systematic review and meta-analysis. *Journal of global health*. 2016;6(1):010401–1.
75. Downs SM, Sackey J, Kalaj J, Smith S, Fanzo J. **An mHealth voice messaging intervention to improve infant and young child feeding practices in Senegal**. 2019, 15(4):e12825.
76. Ogbo FA, Akombi BJ, Ahmed KY, Rwabilimbo AG, Ogbo AO, Uwaibi NE, Ezeh OK, Agho KE. Maternal obotG, Collaboration CHR: **Breastfeeding in the Community—How Can Partners/Fathers Help? A Systematic Review**. 2020, 17(2):413.
77. Bezner Kerr R, Dakishoni L, Shumba L, Msachi R, Chirwa M. "We grandmothers know plenty": breastfeeding, complementary feeding and the multifaceted role of grandmothers in Malawi. *Soc Sci Med*. 2008;66(5):1095–105.
78. Negin J, Coffman J, Vizintin P, Raynes-Greenow C. The influence of grandmothers on breastfeeding rates: a systematic review. *BMC Pregnancy Childbirth*. 2016;16(1):91.

Tables

Table 1: Summary of eligible studies

Author	Design	Participants	Region	Intervention components	Location of intervention delivery	Outcome measures	Statistical analysis	Results
Baxter et al., 2016 [53]	Quasi-experimental	Experimental group: Before intervention=173 After intervention=269	Oromia	EBF promotion (Home visits, educational materials, and training of influential community and family members)	Health facility and community-based	EBF	Percent change in proportion	EBF increased from 69.4% to 75.1%, but not statistically significant
Berti et al., 2010 [54]	Quasi-experimental	No information	No information	Breastfeeding communication through community-based interventions for behaviour change	Community-based	EBF	Percent change in proportion	Higher improvement in exclusive breastfeeding
Buchanan et al., 2012 [55]	Quasi-experimental	No information	No information	Behavioural change communication Community mobilization Capacity building	Health facility-based and community-based	EIBF EBF	Percent change in proportion	EIBF increased from 31.0% to 77.0% EBF increased from 73.0% to 95.0%
Callaghan-Koru et al., 2016 [56]	Quasi-experimental	Experimental group: Before intervention=218 After intervention=215	Tigray Oromia Amhara SNNPR	An integrated package of facility-based kangaroo mother care Community-based promotion of EBF	Health facility and community based	EIBF EBF	Percent change in proportion	EIBF significantly increased from 51.4% to 67.9% (P value <0.01) EBF increased from 86.0% to 95.8% (P value <0.01)
Carnell et al., 2014 [57]	Quasi-experimental	Experimental group: Before intervention=1016 After intervention=911 Control group: Before intervention=1074 After intervention=903	Oromia Amhara SNNPR	Strengthen the health system Improve health workers' performance Engage the community	Health facility and community based	EBF	Difference-in-difference	No significant difference in the improvement of EBF was observed between intervention and control groups
Kang et al., 2017 [63]	Cluster randomized trial	Experimental group: 570 Control group: 629	Oromia	Community-based participatory nutrition promotion program Daily group nutrition sessions Follow-up visits	Community-based	Meal frequency Dietary diversity	Mixed effect multilevel regression	There was a significant improvement in meal frequency No significant improvement and dietary diversity
Kim et al., 2016 [58]	Quasi-experimental	Experimental group:	SNNPR	Behavioural change	Community-based	EIBF	Fixed effect regression	Exposure to one type of

		Before intervention=1481 After intervention=1494	Tigray	communication interventions including: Advocacy and policy dialogues Interpersonal communication and community mobilization Mass communication		EBF Introduction of complementary foods MDD MMF MAD	modelling	intervention: EIBF (OR = 1.88; 95% CI: 1.08, 3.27); No significant effect on EBF, MDD, MMF, and MAD Exposure to two types of interventions: EIBF (OR = 2.07; 95% CI: 1.09, 3.91); MDD (OR = 6.87; 95% CI: 1.27, 37.14); No significant effect on EBF, MMF, and MAD Introduction of complementary foods increased from 37.4% to 59.7% (P-value <0.001)
Kim et al., 2019 [64]	Cluster-randomized trial	Experimental group: Before intervention=1328 After intervention=1360 Control group: Before intervention=1318 After intervention=1360	Amhara region	Behavioural change communication interventions including: Interpersonal communication Nutrition sensitive agricultural activities community mobilization Mass communication	Community-based	Introduction of complementary foods MDD MMF	Fixed effect regression modelling	Exposure to one group of intervention: MDD (OR = 1.05; 95% CI: 0.74, 1.48) MMF (OR = 1.05; 95% CI: 0.90, 1.23) Exposure to two groups of intervention: MDD (OR = 1.82; 95% CI: 1.14, 2.89) MMF (OR = 1.69; 95% CI: 1.13, 2.52) Introduction of complementary foods did not show any improvement
Kung'u et al., 2018 [59]	Quasi-experimental	Experimental group: Before intervention=2570 After intervention=2905	Afar	Behaviour change interventions Integrating nutrition to the	Health facility	EIBF EBF at six months	Logistic fixed-effect regression	EIBF (OR = 1.70; 95% CI: 1.17, 2.46) EBF at six months (OR =

		Control group: Before intervention=1670 After intervention=1620		frontline workers' guideline Family education and counselling booklet				2.62 95% CI: 0.07, 1.03)
Mulualem et al., 2016 [60]	Quasi-experimental	Experimental group: Before intervention=80 After intervention=80 Control group: Before intervention=80 After intervention=80	SNNPR	Nutrition education (individual and group sessions, and recipe demonstration) based on the HBM model	Community-based	Meal frequency	ANOVA	MMF frequency decreased in both experimental and control groups
Negash et al., 2014 [61]	Quasi-experimental	Experimental group: Before intervention=100 After intervention=81 Control group: Before intervention=92 After intervention=76	SNNPR	Nutrition education using visual materials Demonstration of food preparation	Community-based	Dietary diversity Meal frequency	Independent sample t-test	Dietary diversity and meal frequency increased over the intervention period
Tariku et al., 2015 [65]	Cluster randomized trial	HBM intervention group: Before intervention=60 After intervention= 54 Traditional nutrition education group: Before intervention=60 After intervention= 56 Control group: Before intervention=60 After intervention= 56	SNNPR	Complementary feeding messages using the HBM model	Community-based	Continued breastfeeding MDD MMF	ANOVA Kruskal-Wallis test	No significant difference in the improvement of continued breastfeeding and MMF HBM intervention group showed significant improvement in MDD (P<0.001)
Villadsen et al., 2016 [62]	Quasi-experimental	Experimental group: Before intervention=775 After intervention=1434	Oromia	Training of health professionals Health education materials	Health facility	EBF at 1 month	Logistic fixed-effect regression	EBF at 1 month (OR = 2.3; 95% CI: 1.4, 3.6)

Control group:	Supervisions of ANC providers
Before intervention=350	
After intervention=422	

EIBF: early imitation of breastfeeding; EBF: exclusive breastfeeding; MDD: minimum dietary diversity; MMF: minimum meal frequency; MAD: minimum acceptable diet; HBM: health belief model; SNNPR: Southern Nations Nationalities and Peoples Region.

Figures

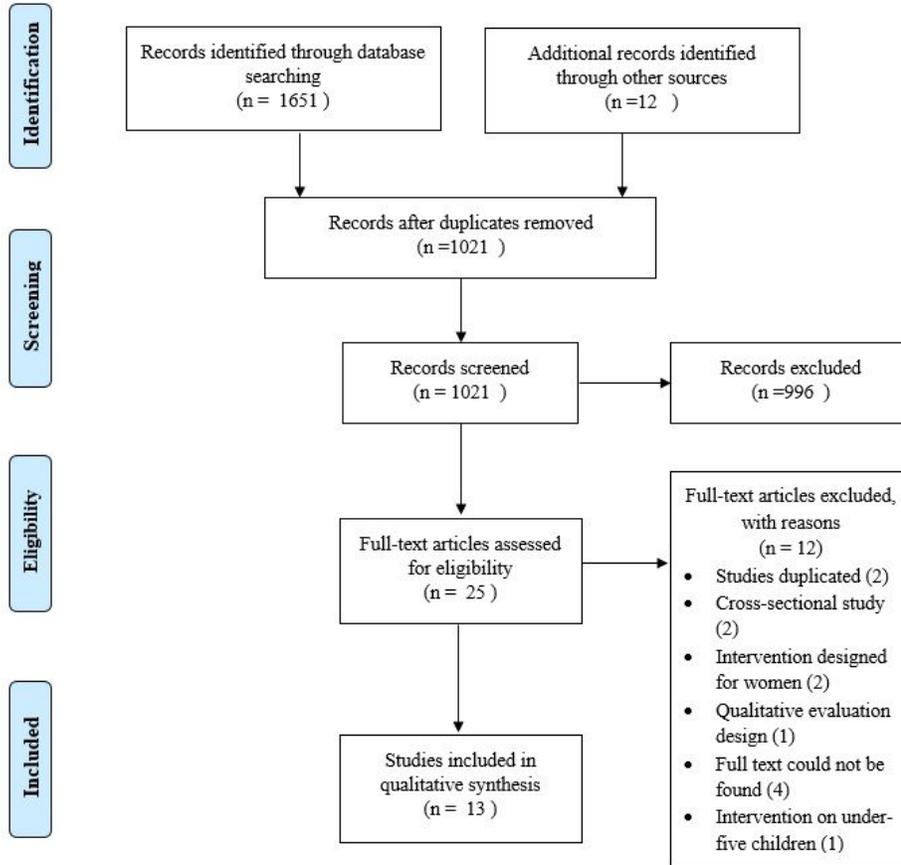


Figure 1

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart for selection of eligible studies [40]

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile3.docx](#)
- [Additionalfile2.docx](#)
- [Additionalfile1.doc](#)