

# The Influence of Breastfeeding Promotion Programs on Exclusive Breastfeeding Rates in Sub-Saharan Africa: A Systematic Review and Meta-Analysis

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# The Influence of Breastfeeding Promotion Programs on Exclusive Breastfeeding Rates in Sub-Saharan Africa: A Systematic Review and Meta-Analysis

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## Abstract

**Background:** The benefits of breastfeeding in promoting child survival are well recognized. As one of the nutritional interventions for children, exclusive breastfeeding protects babies from various diseases that contribute to infant morbidity and mortality. However, no systematic review and meta-analysis has examined the influence of breastfeeding promotion programs on exclusive breastfeeding rates in sub-Saharan Africa.

**Research Aim:** We examined the influence of breastfeeding promotion programs on exclusive breastfeeding rates at < 1 month, and at 1–5 months of breastfeeding in sub-Saharan countries including Ghana, Burkina Faso, Uganda, South Africa, Guinea-Bissau, Kenya, Tanzania, and the Democratic Republic of Congo.

**Methods:** A systematic review and meta-analyses study of randomized controlled trials and quasi-experimental studies was conducted by searching in electronic databases and articles' reference lists. Two investigators independently evaluated and extracted the data. A total of 131 studies were identified using five databases. Of the 10 studies meeting the inclusion criteria for systematic review, seven studies were included in the meta-analysis. We used a random-effects model to pool studies together and performed a subgroup analysis.

**Results:** Breastfeeding promotion programs resulted in significantly higher exclusive breastfeeding rates at < 1 month (OR = 1.60, 95% CI [1.36, 1.86]). However, there was no significant effect observed for exclusive breastfeeding at 1–5 months. Combined interventions were more effective in improving exclusive breastfeeding rates than individual counseling or home-based counseling alone.

**Conclusion:** Breastfeeding promotion programs in sub-Saharan Africa are effective in increasing exclusive breastfeeding rates at 6 months after birth.

## Keywords

breastfeeding, breastfeeding promotion programs, counseling, exclusive breastfeeding, health promotion, meta-analysis, sub-Saharan Africa, systematic review

## Background

The benefits of breastfeeding in promoting child survival are well recognized (Victora et al., 2016). Frank et al. (2019) reported that exclusive breastfeeding has protective effects against gastrointestinal infections in the infant while lowering the risk of cardiovascular diseases and cancer in mothers (Ciampo et al., 2018). Thus, the World Health Organization (WHO) called for concerted efforts, globally, to increase exclusive breastfeeding rates to 70% or higher by 2030 in children under 6 months of age (WHO, 2018). However, low exclusive breastfeeding rates persist in

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sub-Saharan African countries, with only 37% of mothers exclusively breastfeeding (Stanaway et al., 2018). Thus, effective interventions are critical to promoting exclusive breastfeeding among sub-Saharan African mothers.

Several determinants contribute to low exclusive breastfeeding rates. Recent evidence indicated that mothers with high levels of breastfeeding self-efficacy were more likely to practice exclusive breastfeeding up to 6 months (Chipojola et al., 2020). Likewise, mothers who perceive they have insufficient milk supply were likely to stop breastfeeding prematurely (Aldalili et al., 2021). Therefore, as one of the nutritional interventions for children, exclusive breastfeeding promotion could help to scale up exclusive breastfeeding rates (Abdulahi et al., 2021). Furthermore, primary health care providers need to take an active role in promoting such breastfeeding programs among mothers in sub-Saharan Africa.

In sub-Saharan Africa, exclusive breastfeeding interventions, including home-based nutritional counseling and support, home-based counseling, and the Ten Steps to Successful Breastfeeding program, have increased exclusive breastfeeding rates (Kimani-Murage et al., 2017; Penfold et al., 2014; Yotebieng et al., 2015). Likewise, researchers of studies in Kenya, Tanzania, Uganda, and the Democratic Republic of Congo (DRC) indicated similar results (Akuze et al., 2015; Kimani-Murage et al., 2017; Ochola et al., 2013; Penfold et al., 2014; Waiswa et al., 2015; Yotebieng et al., 2015). Several systematic reviews in low-middle income countries have reported peer counseling, lactation consultation, and prenatal breastfeeding education to improve breastfeeding duration and exclusivity (Chapman et al., 2010; Imdad et al., 2011; Lumbiganon et al., 2012). Accordingly, we hypothesized that breastfeeding education programs may be beneficial in improving exclusive breastfeeding outcomes. To our knowledge, no researcher has examined the effectiveness of breastfeeding promotion programs on exclusive breastfeeding rates in sub-Saharan Africa. Furthermore, it is not known which format of intervention is most effective in improving exclusive breastfeeding rates.

We examined the influence of breastfeeding promotion programs on exclusive breastfeeding rates at < 1 month, and at 1–5 months of breastfeeding in sub-Saharan countries including Ghana, Burkina Faso, Uganda, South Africa, Guinea-Bissau, Kenya, Tanzania, and the DRC.

## 1 Methods

### Research Design

A systematic review and meta-analytic study was conducted in which the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement was used as a guide (Haroon et al., 2013). This study design enabled us to evaluate randomized controlled and quasi-randomized trials targeting home- or facility-based interventions for breastfeeding.

## Key Messages

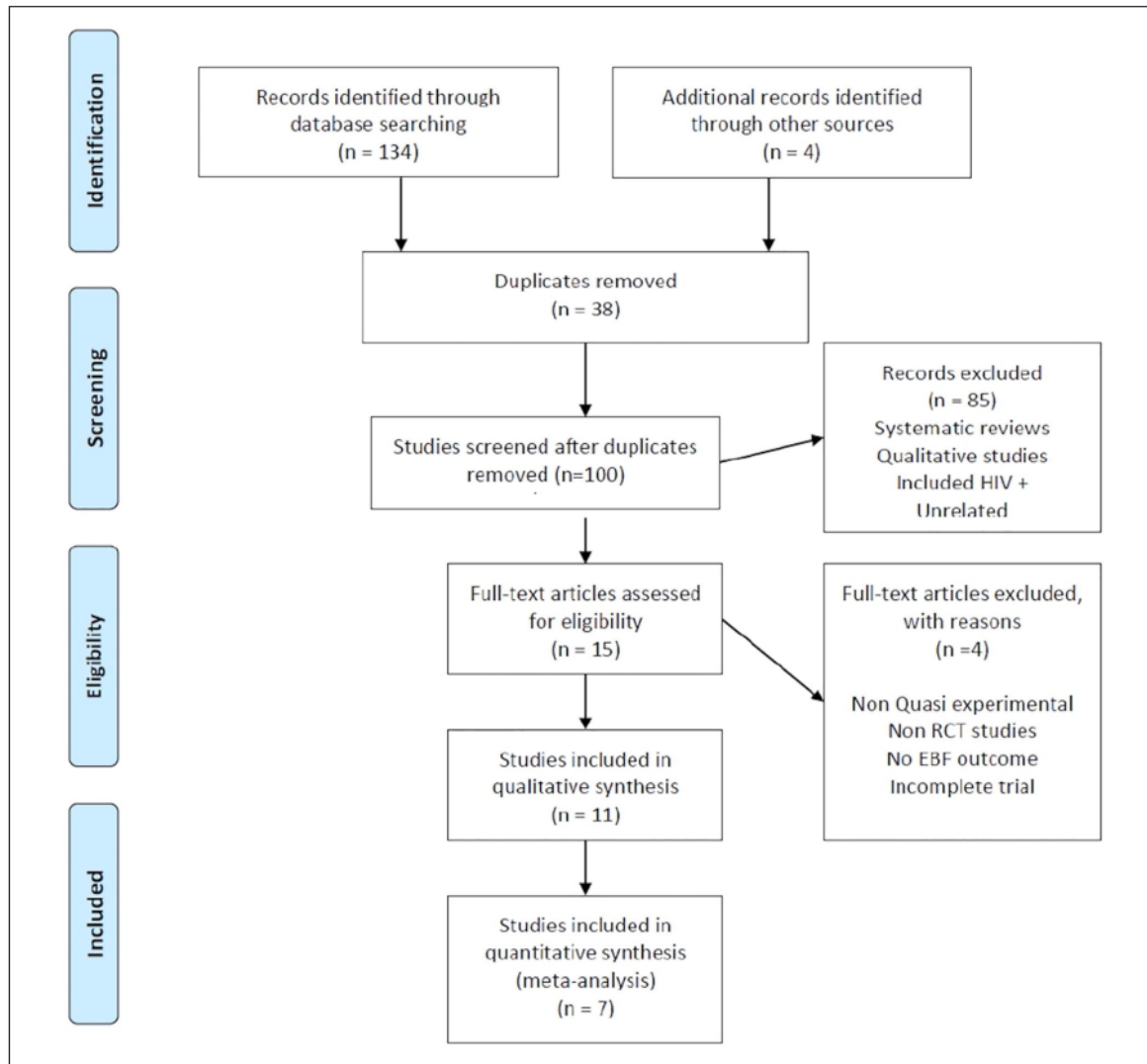
- Our analysis found that breastfeeding promotion programs positively influence exclusive breastfeeding at 1 month and from 1–5 months postpartum.
- Individual counseling programs were more effective at improving exclusive breastfeeding rates at 1–5 months postpartum than combined (individual and group) or group counseling programs
- Home-based counseling programs were more effective at improving exclusive breastfeeding at 1–5 months postpartum than facility-based counseling programs.

## Sample

The following were the inclusion criteria: (1) study participants were women intending to breastfeed or breastfeeding women receiving various breastfeeding promotion interventions; (2) the types of breastfeeding interventions or support programs included home-based nutritional counseling, breastfeeding counseling, home-based counseling, peer counseling, home visit strategy, the Ten Steps to Successful Breastfeeding program, and community health strategy; (3) the comparison group was standard/usual care; (4) the study outcome was exclusive breastfeeding; and (5) studies were conducted in sub-Saharan Africa and were published in English.

We excluded studies on breastfeeding problems (i.e., nipple pain from manual expression) and women whose infants were preterm, had low birth weight, suffered prenatal diseases and abnormalities of the tongue (i.e., ankyloglossia), or were admitted in the Neonatal Intensive Care Unit (NICU). In addition, studies whose participants were HIV positive, or whose intervention programs focused on skin-to-skin contact or delay in the use of a pacifier, were also excluded.

The initial search strategy identified 134 articles from various databases including PubMed, Medline, EMBASE, CINAHL, and the Cochrane Library. Furthermore, four references were identified through other sources (i.e., snowball; Figure 1). Thus, the initial screening process resulted in 138 studies, after which 38 duplicates were removed. This resulted in 100 eligible full-text articles. Of these, 85 were excluded as they were either systematic reviews, qualitative in nature, included participants with HIV, or were unrelated. Subsequently, 15 full-text articles were assessed for eligibility. A further exclusion of four articles occurred based on their study design: non-quasi experimental, not an RCT, and not having exclusive breastfeeding as an outcome. Finally, 11 full-text articles were included in the qualitative synthesis while only seven full-text articles were included in the quantitative as the remaining three studies either adopted a *p* value or reported no statistical effect instead of the odds ratio (*OR*) for its analysis.



1 **Figure 1.** PRISMA Flow Diagram.

### Measurement

In this study, the following definition was established for the study outcome of interest “exclusive breastfeeding”:

Exclusive breastfeeding refers to a child receiving only human milk (including milk expressed or from a wet nurse) and no other types of milk or solids, but may include vitamins, drops of other medicines, and oral rehydration therapy (World Health Organization, 2008). This variable was treated as a dichotomous variable (yes or no) and it was based on 24 hr recall of what the participants had fed their infants. This was documented in a self-reported questionnaire. Based on a prior study (Haroon et al., 2013), we included studies with time intervals of < 1 month

3 (end of early postpartum to 30 days), and 1–5 months (2nd month to the end of 6 months).

Based on a prior meta-analysis (Chipojola et al., 2020), intervention categories were as follows: (a) level of care: the intervention was either facility-based, home-based, or a combination of both facility and home-based 3; (b) format: the intervention was either offered at individual or group level, or had a combination of both individual and group level formats.

Two authors independently assessed the risk of bias for each study using the criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions*

(Higgins & Green, 2011). Review Manager (RevMan Version 5.3, 2014) was used to conduct the risk of bias appraisal including (1) random sequence generation, (2) allocation concealment (selection bias), (3) blinding of participants and personnel, (4) blinding of outcome assessment (performance bias), (5) incomplete outcome data (attrition bias), and (6) selective outcome reporting (reporting bias).

### Data Collection

A three-step search strategy was utilized which encompassed an initial literature search on CINAHL, MEDLINE, PubMed, EMBASE and Cochrane databases from January 1, 2000 to March 30, 2021. Two authors then identified studies independently using these initial keywords: “breastfeeding programs” OR “exclusive breastfeeding” AND “sub-Saharan Africa.” After removal of duplicates, two authors screened the titles and abstracts of potential eligible studies independently. Two review authors independently assessed all potential studies to be included, and if any disagreements among the study investigators arose they were to be resolved by the third reviewer through discussion. However, such a scenario never occurred. The full search strategy has been attached as a supplementary material.

Using a structured data extraction form designed by the authors, two authors (bilingual) independently extracted and summarized the data using matrices as follows:

Study’s first author, date of publication, study aim/question, sample (brief description and N), and design (using research terms; Table 1), variables measured, instruments used to measure each variable, and reliability and validity of each instrument (Table 2). Any disagreements in the data extraction were resolved through discussion with the third author. Additionally, authors also examined the methodological congruence as well as the unity and consistency between study aims, analysis and measurement.

### Data Analysis

Frequencies and proportions of exclusive breastfeeding at < 1 month and at 1–5 months in the intervention and control groups were abstracted from each study included in the meta-analysis. The RevMan Version 5.3 was used for meta-analysis and for checking the accuracy of our data. The results displayed a summary of the *OR* with 95% CI for dichotomous data.

Pooling in a statistical meta-analysis was done when the included studies were not heterogeneous in their designs, populations, and outcome measures. A low *p* value (< .10) or large chi-squared statistic relative to its degree of freedom was used to assess heterogeneity. A value of  $I^2 > 50\%$  was suggestive of high heterogeneity. If high heterogeneity was found, possible causes were explored using a random-effects

model. Accordingly, meta-analyses were performed separately for exclusive breastfeeding at < 1 month and at 1–5 months. We performed a moderator analysis to do a comparison of the estimates of the participants’ characteristics, intervention details, and potential covariates on exclusive breastfeeding rates, thus examining the factors underlying any observed heterogeneity. We conducted a subgroup analysis by dividing studies into groups as well as comparing the observed effects between the groups. A subgroup analysis was carried out to explore potential factors underlying the relationship of the intervention programs and their outcomes as follows: (a) group versus individual counseling or combined counseling (individual and group counseling), and (b) home-based interventions versus facility-based interventions or combined interventions. These covariates were based on a prior study and pre-specified characteristics (Chipojola et al., 2020). We determined the internal methodological congruence for included studies by assessing the consistencies of study aims, research design, measurement and analysis. Publication bias was determined using the Begg and Mazumdar (1994) rank correlation test by Kendall’s tau statistics with a continuity correction. A *p* value < .05 signified the presence of publication bias (Begg & Mazumdar, 1994). Furthermore, we assessed the robustness of our study findings using a sensitivity analysis.

## Results

### Sample Characteristics

In total, 231–7421 studies of prenatal and postnatal mothers were included. A large proportion of the mothers were Kenyan, between the ages of 24–25 years, and had participated in a breastfeeding promotion program in the community setting (Table 2).

Several studies adopted different breastfeeding support interventions. Of the 10 studies, seven were home-based, one was facility-based, while the remaining two had a combination of facility-based and home-based interventions. Furthermore, eight of the studies included individual counseling, one combined individual and group counseling, and the rest used group counseling alone (Table 1).

### Meta-Analysis

*Influence of Breastfeeding Promotion Programs on Exclusive Breastfeeding.* Researchers of four and three of the included studies examined exclusive breastfeeding at < 1 month (Figure 2) and at 1–5 months (Figure 3) postpartum, respectively. We found breastfeeding promotion programs to significantly increase exclusive breastfeeding rates in the 1st month postpartum (*OR* = 1.60, 95% CI [1.36, 1.86],  $I^2 = 12\%$ ) but not at 1–5 months.

**Table 1.** Aims, Sample Size, Setting and Designs of the Reviewed Studies ( $N = 11$ ).

1 <sup>st</sup> Author (Year) Country	Study Aims/Questions	N	Setting	Design
Aidam (2005) Ghana	1) The effect of lactation counseling on EBF rates 2) The timing of EBF support most effective in improving EBF rates	231	Community & Urban health facility	RCT
Engelbrechtsen (2014) Burkina Faso, South Africa, Uganda	Is there was any significant difference in growth patterns between the intervention and control clusters by 24 weeks of age.	2579	Community	Cluster-RCT
Jakobsen (2008) Guinea-Bissau	To evaluate the impact of promotion of EBF on infant health in Guinea-Bissau, West Africa.	1721	Community	RCT
Kimani-Murage (2016) Kenya	To determine the potential effectiveness of the Kenyan Community Health Strategy in promoting EBF in urban poor settings in Nairobi, Kenya	7421	Community	Quasi-experimental
Kimani-Murage (2017) Kenya	To test the effectiveness of a home-based intervention using CHWs on EBF for 6 mos.	1110	Urban poor community	Cluster RCT
Kirkwood (2013) Ghana	To test the home-visits strategy in sub-Saharan Africa by assessing the effect on all-cause NMR and essential newborn-care practices.	6029	Community	Cluster RCT
Ochola (2013) Kenya	To determine the impact of facility-based semi-intensive and home-based intensive counselling in improving EBF in a low-resource urban setting	265	Community & health facility	RCT
Penfold (2014) Tanzania	To determine the effect of the intervention on newborn care behaviours in the community one year after full implementation.	5240	Community	Cluster-RCT
Tyllerskr (2011) Burkina Faso, South Africa, Uganda	To assess the effect of BF counselling by peer counsellors in Africa	2579	Community	Cluster-RCT
Waiswa (2015) Uganda	To assess the effect of a home visit strategy combined with health facility strengthening on uptake of newborn care-seeking, practices and services, and to link the results to national policy.	395	Community	Cluster-RCT
Yotebieng (2015) DRC	To assess the effect on BF outcomes of a short-cut implementation of the Ten Steps to Successful BF program, the key component of the BFHI.	975	Health facility	Cluster-RCT

Note. BF = breastfeeding; EBF = exclusive breastfeeding; NS = not specified; CHWs = community health workers; NMR = neonatal mortality rate; BFHI = Baby-Friendly Hospital Initiative; DRC = Democratic Republic of Congo; MR = mortality rates; RCT = randomized controlled trial.

### Subgroup Analysis

The subgroup analysis demonstrated that both combined ( $OR = 2.58$ , 95% CI [1.24, 5.37]) and individual counseling ( $OR = 1.55$ , 95% CI [1.35, 1.79],  $I^2 = 0\%$ ) have significantly high odds of promoting exclusive breastfeeding rates (Figure 4). Furthermore, subgroup analysis on the level of care indicated that combined home-based and facility-based counseling ( $OR = 1.72$ , 95% CI [1.00–2.98],  $I^2 = 57\%$ ), and home-based counseling alone ( $OR = 1.64$ , 95% CI [1.37–1.97],  $I^2 = 0\%$ ) were likely to increase the rates of exclusive breastfeeding at < 1 month of delivery.

At 1–5 months post-birth, our subgroup analysis indicated that both individual ( $OR = 8.06$ , 95% CI [6.44, 10.09]), group ( $OR = 1.39$ , 95% CI [1.06, 1.82]), and combined (individual and group) breastfeeding counseling ( $OR = 2.81$ , 95% CI [1.76, 4.48]) had significant effects on exclusive breastfeeding rates (Figure 5).

Assessment of Publication Bias, Sensitivity Analysis and Study Quality. The results indicated that Kendall's  $s$  statistic was 0.5,  $z = 1.02$ ,  $p = .31$  for exclusive breastfeeding at < 1 month postpartum. Similarly, exclusive breastfeeding at 1–5 months postpartum with Kendall's  $s$  statistic was 0.00,  $z = 0.00$ ,  $p = 1.00$ . These findings indicated no publication bias.

We found no outliers after excluding the research with the largest effect size on exclusive breastfeeding at < 1 month and at 1–5 months postpartum. The effect sizes were all found to be within two standard deviations of the point estimates. Exclusive breastfeeding at 1–5 months postpartum indicated significant results ( $OR: 1.60$ , 95% CI [1.37, 1.86]).

Overall, eight studies fulfilled the random sequence generation (selection bias) criteria. The majority of the studies (6–8) had unclear risk for allocation concealment, blinding of participants and personnel, and blinding of outcome

**Table 2.** Characteristics of the Methodologies of the Reviewed Articles (N = 11).

Country	Author (Year)	Intervention Groups	Time Points	Outcomes	Measurement	Reliability & validity	Analysis
Aidam (2005) Ghana	I = Group-based lactation counselling C = Education about health-related topics	Perinatal 1–6 mos.	EBF (yes or no)	Questionnaire interviews	Face validity	Comparing the percentages of EBF between groups $\chi^2$	
Engbreetsen (2014) Burkina Faso, South Africa, Uganda	I = Group-based peer counselling home visits C = No EBF promotion	Perinatal 12 & 24 wks.	EBF diarrhea prevalence	Questionnaire/ interviews	Face validity	Linear Mix Effects Regression Model	
Jakobsen (2008) Guinea-Bissau	I = Individualized home-based health education sessions C = Information about water and weaning food	Perinatal 4–6 mos.	EBF, infant morbidity mortality	Demographic health surveillance system/Routine registration system	Content validity Data limited to 7 days after measures	Hazard Regression Model	
Kimani-Murage (2016) Kenya	I = Individualized home-based nutritional counselling C = Standard care counselling	Perinatal 2, 4 & 6 mos.	EBF	Questionnaires	Content validity	$\chi^2$ Multiple Logistic Regressions	
Kimani-Murage (2017) Kenya	I = Individualized home-based nutritional counselling C = Regular training	Perinatal	EBF 2, 4 & 6 mos.	Questionnaires	WHO definitions	$\chi^2$ Logistic Regressions	
Kirkwood (2013) Ghana	I = Group-based Newhints home visits C = Routine care	Perinatal 26–32 days old	All-cause NMR/1000 livebirths	Birth forms	Captured the full duration of the neonatal period	Random-Effects Logistic Regression	
Ochola (2013) Kenya	I = Individualized facility-based semi-intensive counselling group C = Usual education	Perinatal 1, 3 & 6 mos	EBF	Questionnaire interviews	Reliability: Training data collectors and pretest and piloted testing. Authors created	Kaplan–Meir Survival	
Penfold (2014) Tanzania	I = Individualized home-based counselling C = Standard care	3 days post birth	BF, childbirth practices	Questionnaire	Pretested and piloted test Trained data collectors	Logistic Regression	
Tyllerskr (2011) Burkina Faso, South Africa, Uganda	I = Peer counselling C = Standard health care/visited by peer counsellors	12 & 24 wks.	EBF	Questionnaire by	Face validity Pilot testing Trained data gatherers	Generalized Linear Model and Poisson Regression	
Waiswa (2015) Uganda	I = Health facility strengthening and individualized home visits C = Standard care	Perinatal Baseline, End line	ANC services, intrapartum care & PNC, Newborn care	Questionnaire	Content validity Trained data collectors	t-test $\chi^2$	
Yotebieng (2015) Democratic Republic of Congo	I = Group-based Ten Steps program C = Standard care	Postnatal 14 & 24 wks.	Initiated BF within 1 h, EBF, diarrhoea respiratory illness	Questionnaire interviews	Used WHO definitions	Generalized Estimating Equations and Log-Binomial Models	

Note. I = intervention; C = control; BF = breastfeeding; EBF = exclusive breastfeeding; NMR = neonatal mortality rate; ANC = antenatal care; PNC = postnatal care; Perinatal = prenatal and postnatal period; WHO = World Health Organization.

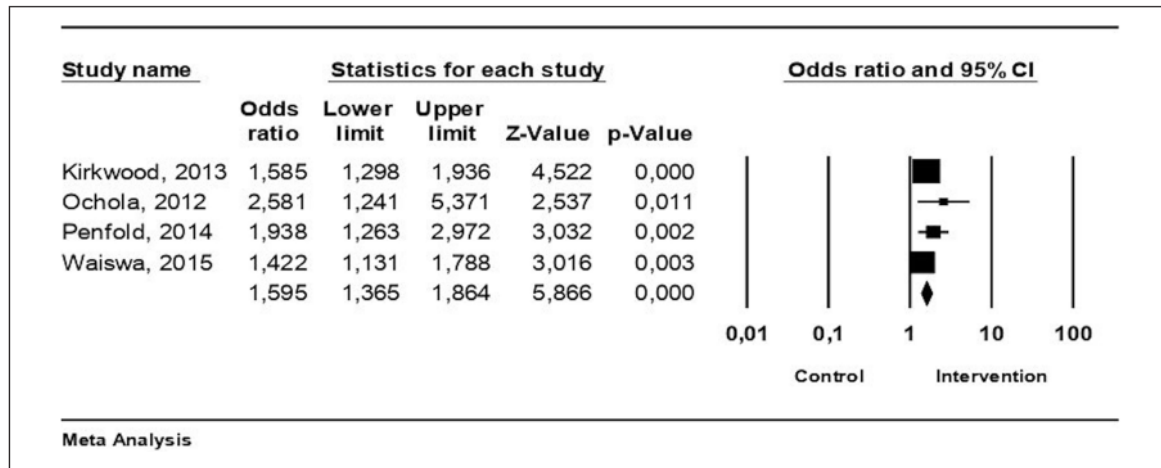


Figure 2. Influences of Breastfeeding Promotion on Exclusive Breastfeeding Rates < 1 Month Postpartum.

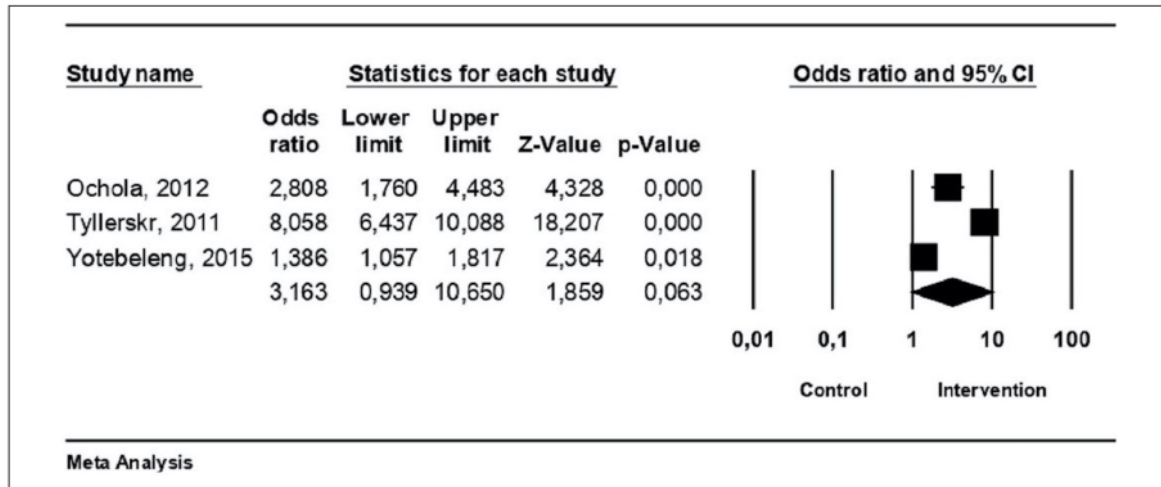


Figure 3. Influences of Breastfeeding Promotion Programs on Exclusive Breastfeeding Rates at 1–5 Months Postpartum.

assessment (self-reported outcomes/objective outcomes). Five studies had low risk of attrition bias; 10 studies had low risk of selective reporting (reporting bias) (Table 3).

**Assessment of Study Congruence.** In terms of internal methodological congruence, all 11 studies were consistent: (a) study aims explored on EBF as their outcomes; (b) research design used randomized controlled trials; (c) measurements used questionnaires, based on the WHO definition, although the 11 studies only reported face validity; and (d) data analysis approaches were appropriate in the included studies. The questions were different as well in regards to their study questions (Tables 1 and 2).

### Discussion

To our knowledge, this is the first systematic review and meta-analysis providing an overview of the current effective breastfeeding programs implemented to promote exclusive breastfeeding rates to infants at least 6 months post-birth in sub-Saharan Africa. In addition, our study employed a subgroup analysis to compare the effectiveness of different types of breastfeeding interventions. We found that the current breastfeeding programs available ranged from home-based nutritional counseling, counseling, home-based counseling, peer counseling, home visits, the Ten Steps to Successful Breastfeeding program, and community health strategies.



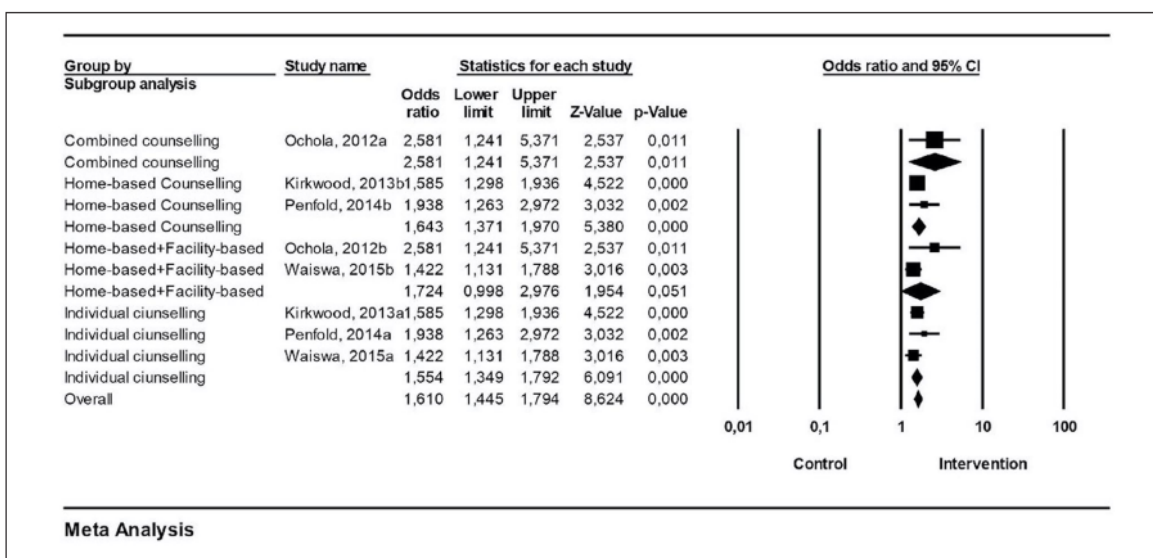


Figure 4. Subgroup Analysis for Exclusive Breastfeeding Rates at < 1 Month Postpartum.

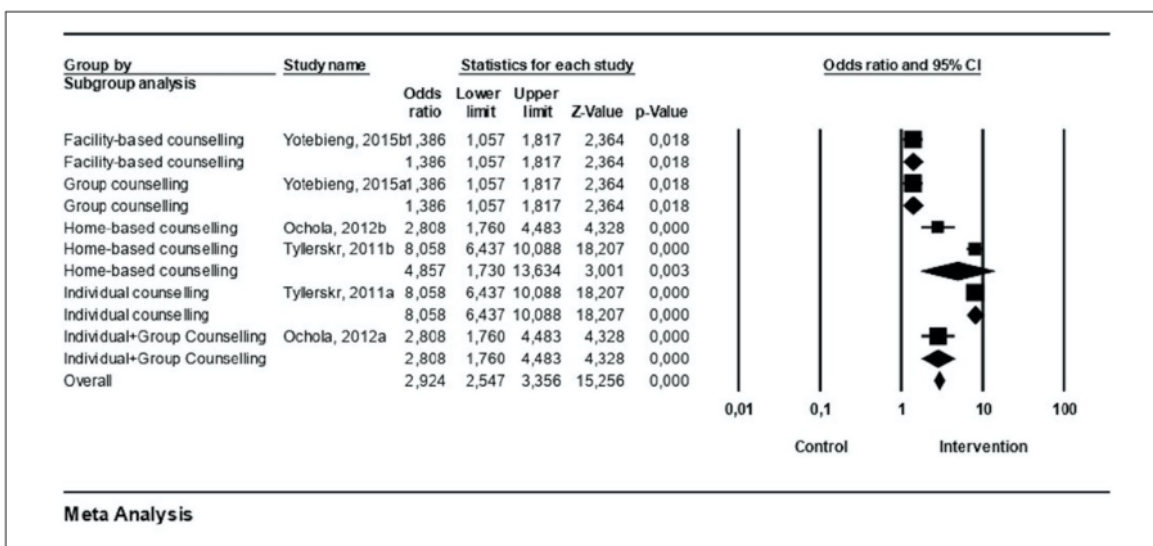


Figure 5. Subgroup Analysis for Exclusive Breastfeeding Rates 1–5 Months Postpartum.

These various breastfeeding intervention programs significantly increased exclusive breastfeeding rates at < 1 month after delivery. However, we did not observe the same finding at 1–5 months postpartum, which may be due to the heterogeneity of the studies and the lack of continuity of exclusive breastfeeding in this region. For instance, one of the included studies reported an exclusive breastfeeding rate of 23.6% at 6 months postpartum (Ochola et al., 2012).

**1** Consistent with a systematic review and meta-analysis (Haroon et al., 2013), our study demonstrates that combined individual and group counseling promoted exclusive breastfeeding. Our findings may imply that women who receive individualized breastfeeding educational sessions in a group setting are more likely to encourage or motivate themselves and others to continue practicing breastfeeding. This may be related to the cultural context in low- and middle-income

**Table 3.** Risk of Bias Assessment for Reviewed Studies (N = 11).

1 <sup>st</sup> Author (Date)	Random sequence generation	Allocation concealment	Selective reporting	Other sources of bias	Blinding (Participants and personnel)	Blinding (Outcome assessment)	Incomplete outcome data
Aidam (2005)	Low risk	Low risk	Low risk	High risk	Low risk	High risk	High risk
Engebretsen (2014)	Unclear risk	Unclear risk	Low risk	Low risk	Unclear risk	Unclear risk	Low risk
Jakobsen (2007)	High risk	High risk	High risk	High risk	Unclear risk	Low risk	Low risk
Kimani-Murage (2015)	High risk	Unclear risk	Low risk	High risk	Unclear risk	Unclear risk	High risk
Kimani-Murage (2017)	Low risk	Unclear risk	Low risk	High risk	Unclear risk	Unclear risk	High risk
Kirkwood (2013)	Low risk	Unclear risk	Low risk	Low risk	Unclear risk	Unclear risk	Unclear risk
Ochola (2012)	Low risk	Unclear risk	Low risk	High risk	Low risk	Low risk	Low risk
Penfold (2014)	Low risk	High risk	Low risk	Unclear	Low risk	Unclear risk	Low risk
Tyllerskr (2011)	Low risk	Unclear risk	Low risk	High risk	High risk	Unclear risk	Low risk
Waiswa (2015)	Low risk	Unclear risk	Low risk	High risk	Unclear risk	Unclear risk	High risk
Yotebieng (2015)	Low risk	Unclear risk	Low risk	High risk	High risk	High risk	High risk

Note. **Low risk** = when a study appears to be free from potential sources of bias; **High risk** = when at least one major risk of bias has been identified; **unclear risk** = when a study has missing information which makes it difficult to assess potential problems and limitations.

countries as most health educational sessions are delivered in a group setting and offered individually as needed to eliminate any misconceptions and enhance breastfeeding confidence (Kavle et al., 2017). Future research examining the effectiveness of combined counseling on exclusive breastfeeding until 6 months postpartum may be warranted.

Our findings corroborate a previous study that reported on the effectiveness of home- and facility-based counseling in increasing exclusive breastfeeding rates (Haroon et al., 2013). The home- and facility-based counseling programs involved in-hospital educational programs followed by five home visits—two during pregnancy and three in the 1st week after birth, which helped mothers seek clarity on issues pertaining to breastfeeding and also encouraged them to practice exclusive breastfeeding until 6 months postpartum (Ochola et al., 2013; Waiswa et al., 2015). Therefore, implementing these strategies on a large scale while at the same time utilizing a combination of individualized counseling with group sessions, facility-based care, and community resources would help ensure that mothers achieve higher exclusive breastfeeding rates until 6 months postpartum.

### Limitations

Several limitations need to be considered when interpreting the results. First, we experienced high heterogeneity; however, this was resolved by conducting a subgroup analysis. Second, the outcome of interest—exclusive breastfeeding—was based on mother's self-report, which might introduce recall bias and social desirability bias. Nonetheless, this is the most common strategy for obtaining information on a mother's breastfeeding outcome in most RCTs. Third, the exclusion of unpublished data and grey literature might have introduced selection bias to the analysis. Fourth, the Begg and Mazumdar rank correlation test had a very low power to

detect publication biases, since this meta-analysis included limited number of studies. Fifth, a mother's breastfeeding practices may have been influenced as a result of access to educational support after being discharged from the hospital. Sixth, only a few studies were available pertaining to exclusive breastfeeding at 1–5 months postpartum. Finally, the variable "type of breastfeeding program" could not be analyzed as a subgroup component.

### Conclusions

Participants who received counseling programs during the 1st month of postpartum had improved exclusive breastfeeding rates compared to mothers who received standard care. Additionally, combined counseling programs were more effective than individual or group counseling programs. Finally, promoting these programs at a large scale may be advantageous for optimizing exclusive breastfeeding coverage. Future studies are needed to further explore this.

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### Author contribution(s)

**Roselyn Chipjola:** Conceptualization; Formal analysis; Methodology; Software; Writing – original draft; Writing – review & editing.

**Madalitso Khwepeya:** Formal analysis; Methodology; Writing – review & editing.

**Kaboni Whitney Gondwe:** Formal analysis; Investigation; Writing – review & editing.

**Yohanes Andy Rias:** Formal analysis; Investigation; Writing – review & editing.

**Mega Hasanul Huda:** Investigation; Methodology; Writing – review & editing.

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### Supplemental Material

Supplementary Material may be found in the “Supplemental material” tab in the online version of this article.

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