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Effectiveness of layperson-based interventions in promoting exclusive breastfeeding: A systematic review and meta-analysis

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ABSTRACT

Objective: The objective of this study is to determine the effectiveness of layperson-based interventions in sustaining exclusive breastfeeding and to identify the optimal characteristics of such layperson-led strategies for promoting exclusive breastfeeding.
Methods: A systematic review and meta-analysis were conducted using a comprehensive search in seven electronic databases from their inception to January 2024. Two independent reviewers assessed the risk of bias using version 2 of the Cochrane Risk of Bias tool for randomized trials.
Results: Out of the 29,703 articles identified, 27 studies met the inclusion criteria and were included in the analysis. A total of 38,412 participants were included in these studies. The majority of the included studies utilized home visits as the intervention method. However, there is limited data available for other interventions, such as group discussions, phone support, short message service, and combined approaches, making it difficult to determine their effectiveness. Laypersons, with or without breastfeeding experience, were found to be effective intervention providers.
Discussion: Home visit interventions conducted by laypersons have proven effective in promoting exclusive breastfeeding. To maximize effectiveness, the content of home visits should be tailored based on the stages of pregnancy, and ideally, the duration of the visits should extend up to six months postpartum to sustain breastfeeding.
Registration: The protocol for this review is registered on PROSPERO (registration number: CRD42021235078). A major deviation from the protocol was the exclusion of network meta-analysis due to the small number of articles identified and the primary outcome being the exclusive breastfeeding rate.

What is already known

- A previous Cochrane review conducted by Balogun et al. in 2016 found that both healthcare professional-led and layperson-led support interventions were effective in increasing breastfeeding initiation rates by improving mothers' confidence and motivation.
- The ongoing global shortage of healthcare professionals further exacerbates the demand for various healthcare services, including breastfeeding support.
- Layperson interventions can serve as an alternative approach to addressing the manpower gap in nursing and healthcare professions.

What this paper adds

- Layperson-based breastfeeding interventions effectively sustain exclusive breastfeeding.
- Laypersons, regardless of their prior breastfeeding experience, can effectively deliver interventions through home visits.
- To maximize the continuation of breastfeeding, the support provided by layperson should ideally extend up to six months.

1. Background

Exclusive breastfeeding (EBF), defined as giving only breast milk (no other food or drink, not even water) except for vitamins and minerals to an infant for the first six months (WHO, 2014), is recommended by the World Health Organization (WHO) for optimal growth and development. The WHO also advises continuing breastfeeding with appropriate complementary foods until two years and beyond. This practice, essential to infant growth and development, is advocated in the WHO and United Nations Children's Fund's (UNICEF) Global Strategy for Infant and Young Child Feeding.

Given the significant impact of breastfeeding on health and the economy, the WHO (2014) set a global target to enhance exclusive breastfeeding rates during the first six months postpartum to 50 % by 2025. The global exclusive breastfeeding rate for infants under six

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months old has increased to 48 % in 2015–2021, showing significant progress toward the World Health Assembly's target of 50 % by 2025. However, to achieve the global target of a 70 % rate by 2030, it is necessary to address further obstacles (UNICEF and WHO, 2022). Factors influencing breastfeeding include maternal age, marital status, education, smoking status, and support from partners, health professionals, community, family, workplace and culture (Thulier and Mercer, 2009). Economic status can also affect the effectiveness of breastfeeding promotion interventions (Rollins et al., 2016).

Examining the support received by breastfeeding mothers is crucial to determining effective interventions that can help women continue exclusive breastfeeding. Evidence suggests that effective breastfeeding support interventions are cost-effective and can yield a return on investment within a few years (Bartick et al., 2017; Renfrew et al., 2012; Rollins et al., 2016). Perinatal support, including home-based or family-based interventions provided by healthcare professionals, has been found to be effective in improving exclusive breastfeeding rates (Rollins et al., 2016). Furthermore, a systematic review and meta-analysis (Kim et al., 2018) suggested that community-based interventions should continue after discharge home, in addition to implementing strategies from the Baby-Friendly Hospital Initiative. This long-term postpartum support can include counseling or individual contact. However, there is a growing shortage of healthcare professionals worldwide, which poses a challenge in meeting the increasing demands for different services. In Hong Kong, for example, it is projected that there will be a shortage of more than 3000 nurses by 2030, even with measures to increase the supply (Health Bureau, 2020). Layperson interventions can serve as an alternative approach to addressing this manpower shortage.

Breastfeeding support strategies, such as postnatal reassurance for mothers, medical staff support, peer support groups, home visits, and phone support, have been adopted to promote breastfeeding initiation and continuity. A Cochrane review (Balogun et al., 2016) found that both healthcare professional-led and layperson-led support were effective in increasing breastfeeding initiation rates by improving mothers' confidence and motivation. No significant differences were observed in breastfeeding outcomes based on the type of person delivering the intervention (Gavine et al., 2022). However, there are limited systematic reviews specifically focusing on layperson-led interventions. Existing reviews primarily focused on either peers or community health workers, although both reported the effectiveness of their interventions (Jolly et al., 2012a; Gilmore and McAuliffe, 2013). These interventions can provide various forms of perinatal support and serve as an alternative approach to addressing the growing shortage of healthcare professionals worldwide.

Both healthcare professional-led and layperson-led support have been found to be effective in increasing breastfeeding initiation rates. However, systematic reviews focusing specifically on layperson-led interventions are limited. This study aims to fill this research gap by conducting a systematic review to examine the effectiveness of layperson strategies in sustaining exclusive breastfeeding and to identify their optimal characteristics or elements.

2. Methods

A layperson is defined as either a peer mother with or without breastfeeding experience or any individual who is not a healthcare professional, such as a nurse or doctor. Exclusive breastfeeding is defined as the infant receiving only breast milk, with no other fluids or solids, except for oral rehydration solutions, vitamin supplements, mineral supplements, or medicines.

The aim of this study is to determine the effectiveness of layperson-based interventions in sustaining exclusive breastfeeding and to identify the optimal characteristics of such layperson-led strategies for promoting exclusive breastfeeding. The primary outcome is the exclusive breastfeeding rate.

2.1. Search strategy

Seven electronic databases, including MEDLINE, British Nursing Index, EMBASE, Cumulative Index to Nursing & Allied Health (CINAHL Plus). PsycINFO, Cochrane Database of Systematic Reviews and the Central Register of Controlled Trials (CENTRAL) and Web of Science, were searched from the inception of the databases to January 2024.

Additionally, we searched the WHO's trial portal and ClinicalTrials.gov to identify unpublished or ongoing studies. The search terms, including appropriate subject headings and wildcards for “layperson”, “peer supporters”, and “breastfeeding”, were combined and adjusted according to the databases' indexing systems. The detailed search strategy for each database can be found in Supplementary Material, Table 1.

The terms used included, but were not limited to: 1) publication types, such as “controlled clinical trial”, “randomized controlled trial” and “cluster”; 2) population or outcome terms, such as “breastfeeding” and “lactation”; and 3) intervention terms, such as “education”, “counselling”, “self-help groups”, “peer support” and “psychosocial”.

2.2. Eligibility criteria

2.2.1. Participants

The studies included in this review considered both antenatal and postnatal mothers as eligible, without restrictions based on the setting. However, studies were excluded if clinical groups, such as mothers with depression or infants with disabilities, constituted 50 % or more of the study samples. This exclusion was informed by evidence of the association between breastfeeding discontinuation and maternal mental health (Gregory et al., 2015), the risk of mother-to-child transmission of human immunodeficiency virus (HIV) by HIV-infected mothers without therapy (De Cock et al., 2000), and the potential insufficiency of breast milk for preterm or ill babies (Donath and Amir, 2008).

2.2.2. Intervention and study design

Studies that included at least one group of layperson interventions aimed at promoting exclusive breastfeeding were eligible for inclusion. There were no limitations on specific comparison groups, active interventions, or non-active controls. Only randomized and cluster randomized controlled trials published in peer-reviewed journals and written in English, were included.

2.3. Studies selection, data extraction, and risk of bias assessment

The items searched from the six databases were imported into Endnote. After removing duplicates, two independent reviewers (HMY and HSLF) screened the titles and abstracts. The full texts were evaluated according to the inclusion criteria defined by the authors. In cases where disagreements arose regarding the selection of studies, discussions were held with reference to the inclusion criteria to ensure correct interpretation, and a consensus was reached. If necessary, a third author (KYWL) was consulted for resolution.

Data extraction was carried out independently by the two reviewers (HMY & HSLF) using a modified version of the Cochrane Collaboration's data collection form for intervention reviews: randomized controlled trials and non-randomized controlled trials, version 3. A standardized extraction form was utilized, tailored to fit the requirements of this systematic review. In cases where discrepancies or disagreements emerged during the data extraction process for specific studies, discussions were held to reach a resolution. In instances where further disagreement persisted, consensus was sought by consulting the third reviewer (KWYL). The extracted information encompassed various aspects, including the study setting; study population, participant demographics and baseline characteristics; details pertaining to the intervention and control conditions; study methodology; recruitment and study completion rates; outcomes and measurement times; indicators of acceptability to users; suggested mechanisms of intervention

action; and information for assessment of the risk of bias were also extracted.

The Cochrane Risk of Bias tool (RoB2), version 2, developed by Sterne et al. in 2019, was employed to assess the risk of bias in the included studies (Sterne et al., 2019). For randomized trials, the RoB2 tool for randomized trials was used, while the RoB2 tool for cluster-randomized trials was utilized for cluster-randomized trials.

The assessment of the risk of bias was performed by two reviewers independently by the two reviewers (HMY, HSLF), and any discrepancies or disagreements regarding the studies were resolved through discussion until a consensus was reached. The third reviewer was consulted whenever necessary to aid in the resolving any differences or disagreements.

2.4. Measures of outcome

The outcome of interest was the proportion of exclusive breastfeeding in each study arm. The effect size was calculated from the extracted data of each study. Relative risk (RR) was calculated for the comparison between study arms, using the extracted number of women exclusively breastfeeding after the intervention and the total number of recruited participants in each arm. An RR >1 was considered to indicate an increased proportion of exclusive breastfeeding, suggesting an effective intervention. The 95 % confidence intervals (CIs) were also reported.

We used the longest duration, up to a maximum of six months postpartum, for studies that had multiple time point measurements. Whenever possible, all the women assigned to one arm were included in the denominator to calculate the RR for handling missing data, in order to prevent overestimation of the intervention's efficiency due to low adherence.

2.5. Data synthesis

Statistical analysis was performed using RevMan 5.4.1. Exclusive breastfeeding rates were calculated using RR and confidence intervals. These data were synthesized in terms of 3–6 months and ≥6 months postpartum. The heterogeneity of the included studies was assessed using I^2 statistics, with I^2 value ranging from 0 to 30 %, 30 to 60 % and 60 to 100 % classified as low, moderate and substantial, respectively (Higgins et al., 2019). A p value of 0.1 was used to determine statistical significance when identifying and measuring heterogeneity, based on the Cochrane Handbook (Higgins et al., 2019). We used a random-effects model, as it allowed for different intervention effects across studies (Higgins et al., 2019).

2.6. Deviations from the protocol

Due to the limited number of articles identified, a network meta-analysis could not be conducted as per the predefined protocol. Another alteration to the protocol was changing the primary outcome to the exclusive breastfeeding rate.

3. Result

3.1. Study selection

A total of 29,703 records were initially identified from the databases. After removing the duplicate records, 27 studies were included in this review. The publication dates of these studies range from 1999 to 2020 (Fig. 1).

3.2. Characteristics of included studies

Table 1 presents a summary of the characteristics of the included studies, listed in alphabetical order. Twelve of the included studies were individually randomized controlled trials, consisting of 11 two-arm trials and 1 three-arm trial. The remaining 15 studies were cluster randomized controlled trials, with 11 two-arm trials and 4 three-arm trials. The included studies were conducted in various countries, with most of them in lower-middle income countries such as Bangladesh, Ghana, Kenya and Pakistan. The prevalence of exclusive breastfeeding at 6 months of age for all included trials was below 50 %, as recommended by the WHO, except for one cluster trial in Uganda (Tylleskär et al., 2011), which reported a 60 % exclusive breastfeeding rate.

3.3. Participants' characteristics of included studies

A total of 38,412 participants of unspecified ethnicity were involved in the 27 included studies, with sample sizes ranging from 66 to 16,329. Three trials (Aksu et al., 2011; Md Monoto et al., 2020; Wong et al., 2007) specifically recruited women who had a vaginal delivery only. HIV positive women were recruited in three trials (Ijumba et al., 2015; Le Roux et al., 2013; Samburu et al., 2020) but Ijumba et al. (2015) and Samburu et al. (2020) excluded these HIV-positive women from the analysis. The majority of the eight trials conducted in high-income countries, including the United States of America (USA) and Hong Kong, had high percentages of participants with low levels of education. Specifically, around 40 % of participants in three studies (Anderson et al., 2005; Reeder et al., 2014; Srinivas et al., 2015) conducted in the USA had less than a high school level education, which we defined as <12 years of formal schooling. Additionally, only around 15 % of participants in the study (Wong et al., 2007) from Hong Kong had a tertiary (university) education level, indicating that the majority had an education level below tertiary.

3.4. Person conducting the interventions

Different types of laypersons were involved in conducting the interventions across the studies. The majority of studies ($n = 13$) used trained peers with breastfeeding experience, while other studies included community health workers ($n = 6$), female laypersons who reached a particular education level ($n = 3$), community volunteers ($n = 3$), traditional birth attendants ($n = 1$), and trained non-specific laypersons ($n = 1$).

3.5. Interventions

The interventions conducted by layperson involved various approaches, including home visits, center visits, phone contact, group discussions, and short message service. Specifically, 17 trials utilized home visits as the primary method of intervention. The content of the home visits primarily focused on breastfeeding education and assessment, problem-solving skills, and providing support. The comparison groups across these home visit groups varied and included standard care ($n = 4$), a breastfeeding hotline in addition to conventional education and support ($n = 1$), home visits covering other health topics ($n = 4$), standard education and standard home counseling ($n = 1$), clinic health services or referral ($n = 4$), or no support ($n = 2$). One study provided no information on the comparison group. Moreover, the duration of home visits varied among the studies. The majority of the studies ($n = 14$) provided home visits during both the antepartum and postpartum periods, while the remaining three studies (Aksu et al., 2011; Coutinho et al., 2005; Leite et al., 2005) delivered home visits only during the postpartum period. All home visit providers received training, regardless of whether they had breastfeeding experience. The breastfeeding counseling course adapted from WHO/UNICEF ($n = 10$) was the most commonly provided training. Only one study provided training in cognitive-behavioral therapy techniques to the providers who performed psycho-educational sessions during the home visits.

Five other studies utilized group discussions with or without other non-breastfeeding-related activities (Maldonado et al., 2020; M'Liria et al., 2020), phone support (Dennis et al., 2002; Md Monoto et al., 2020), and a two-way short message service (Martinez-Brockman et al., 2018). All of these studies were conducted from antepartum to postpartum with various control groups.

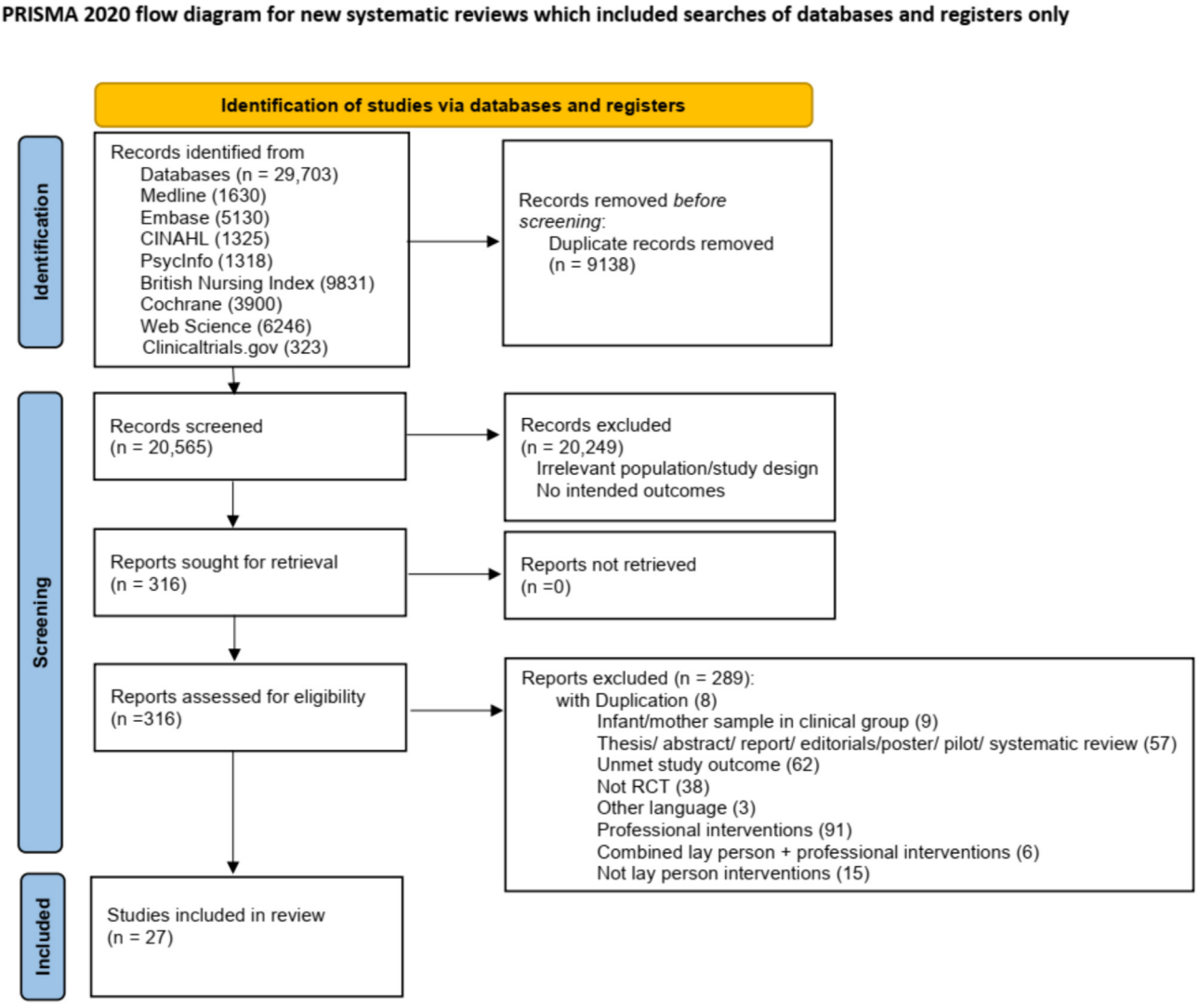

Fig. 1. PRISMA flow diagram.

Other studies (Jolly et al., 2012a, 2012b; Muirhead et al., 2006; Srinivas et al., 2015; Wong et al., 2007) included more than one component in the layperson intervention, with combinations varying across studies, including home visits, clinic visits, phone contact, and in-hospital visits. All of these studies were compared with standard support.

Most of the studies referred to standard, conventional, or routine care as breastfeeding education and support in hospitals or clinics (Aksu et al., 2011; Anderson et al., 2005; Coutinho et al., 2005; Md Monoto et al., 2020; Mituki-Mungiria et al., 2020; Srinivas et al., 2015; Wong et al., 2007) or nutrition education in health centers (M'Liria et al., 2020; Ochola et al., 2013; Samburu et al., 2020), while other types of standard care included home-based or hospital-based advice from nurses (Jolly et al., 2012a, 2012b), and breastfeeding support groups and workshops provided by community midwives or health visitors (Muirhead et al., 2006).

When considering the intensity of interventions, there was a wide range of variation, from one to more than ten contact times, with the majority of trials (n = 12) involving 6–10 contacts.

3.6. Risk of bias assessment

The details of each included study are shown in Fig. 2, which presents a summary of the methodological quality and characteristics of the included studies using the Robvis tool (McGuinness and Higgins, 2021). Most of these studies (n = 20) had some concerns or a high risk of bias in randomization and concealment of the allocation sequence. Among the 16 studies classified as high risk for the effect of adhering to the intervention, four studies (Anderson et al., 2005; Ara et al., 2018; Md Monoto et al., 2020; Srinivas et al., 2015) had inconsistent non-protocol interventions (referred to as additional contacts, such as visits or phone-based support that might be provided upon mothers' request, which were inconsistent with the trial protocol) that were imbalanced across intervention groups, and an inappropriate analyses were used to estimate the effect of adhering to the intervention. The remaining 12 studies either did not report information on adherence to interventions or had a large number of non-adherences, with inappropriate analyses of the effect. Only two studies (Maldonado et al., 2020; Srinivas et al., 2015) out of the 27 included studies had an overall low risk of bias.

3.7. Overall effect of intervention on exclusive breastfeeding

All the included studies measured the exclusive breastfeeding rate or prevalence at various time points as either their primary or secondary outcome. Other measured outcomes included the breastfeeding rate, neonatal mortality rate, early contact between participants and layperson, and differences in the initiation or duration of breastfeeding. Early contact between participants and layperson refers to the interaction

Table 1
Characteristics of included studies.

Study Country	Study design	Participant characteristics	Intervention and timing of support	Control	Outcome (primary or secondary)	Effect size (RR)
Aksu et al., 2011 Turkey	RCT 2-arm	Primaparous, giving birth through the vaginal route	Trained supporter provides face-to-face home visits, breastfeeding education/support (n = 33) AN + PN	Standard breastfeeding education and support from nurses and midwives (n = 33)	Prevalence of EBF at 6 months (primary)	Reported ITT: I: 13/30 (43 %) vs C: 7/30 (23 %) p = 0.04 Calculated ITT: RR 1.87 95 % CI 0.8625–3.9988
Anderson et al., 2005 United States	RCT 2-arm	Low-income inner-city women, absence of medical conditions	Peer supporter with breastfeeding experience provides face-to-face home visits, support and counseling (n = 90) AN + PN	Conventional breastfeeding education and support, and a breastfeeding hotline supported by staff nurse/lactation consultant in case of lactation crisis (n = 92)	EBF rates at 3 months (primary)	Reported: I: 17/63, C: 2/72 RR of nonexclusive BF at 3 months: 1.33 95 % CI 1.14–1.56 Calculated ITT: RR 9.7143 95 % CI 2.3349–40.4164 p = 0.0018
Ara et al., 2018 Bangladesh	RCT 2-arm	16–49 years old, <4 living children and/or < 6 parities	Peer supporter with breastfeeding experience provides face-to-face home visiting peer counseling (n = 131) AN + PN	No intervention (n = 140)	Prevalence of EBF at 5 months (primary)	Reported I: 96 (73 %), C: 38 (27 %) Adjusted odds ratio 5.10 CI [2.89, 9.01], p < 0.001 Calculated ITT: RR 2.54 95 % CI 1.8684–3.4574
Coutinho et al., 2005 Brazil	RCT 2-arm	Women giving birth to singleton infants	Female layperson provides face-to-face home visits (n = 175) PN	Baby-friendly steps in hospital without home visit (n = 175)	Mean aggregated prevalence of EBF for days 10–180 (primary)	Reported I: 45 %, C: 13 %, p < 0.0001 Calculated ITT: RR: 3.46 95 % CI = 2.2376–5.3123
Dennis et al., 2002 Canada	RCT 2-arm	>16 years old, had a singleton birth at >37 weeks gestation	Peer supporter with breastfeeding experience conduct telephone support (n = 132) PN	In-hospital and community postpartum support services by professionals (n = 126)	EBF at 12 weeks (primary)	Reported I: 75/132; C: 50/124, p = 0.01 Calculated ITT: RR: 1.43 95 % CI = 1.1022–1.8600 p = 0.0072
Haider et al., 2000 Bangladesh	Cluster RCT	16–35 years old, <4 living children and/or < 6 parities	Peer counselor with breastfeeding experience provides face-to-face home visiting counseling (n = 323) AN + PN	No home visits (n = 330)	Prevalence of EBF at 5 months (primary)	Reported I: 70 %; C: 6 %, CI: 57–71 %, p < 0.0001 Calculated ITT: RR: 12.14 95 % CI = 7.5829–19.4353
Ijumba et al., 2015 South Africa	Cluster RCT	>17 years old, only HIV negative mothers are included in analysis	Community health workers provide face-to-face home visits (n = 1821) AN + PN	Community health worker home visit providing essential information and support to pregnant women on how to obtain state social welfare grants (n = 2136)	Infant feeding practice (rate of EBF) at 12 weeks postpartum (primary)	Reported I: 27.1 %; C: 13.9 % Adjusted odds ratio: 2.31 CI: 1.82–2.93 For HIV-negative participants: Odds ratio: 2.7 (1.98–3.69); adjusted odds ratio: 2.70 (2.01–3.70) Calculated ITT: I: 441/1684; C: 260/1972 RR: 1.99

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Table 1 (*continued*)

Study Country	Study design	Participant characteristics	Intervention and timing of support	Control	Outcome (primary or secondary)	Effect size (RR)
						95 % CI = 1.7289–2.2819
Jolly et al., 2012a, 2012b United Kingdom	Cluster RCT	Estimated delivery date between 1st February 2007 and 31st July 2007	Peer supporter with breastfeeding experience provide face-to-face home and clinic visit (n = 416) AN + PN	Routine maternity care - community AN and PN midwife care including some home-based or hospital-based BF advice (n = 432)	Any BF at 10–14 days, 6 weeks and 6 months (primary) EBF rate at 6 months (secondary)	Reported I: 48/271; C: 59/301 Odds ratio 0.89 95 % CI: 0.58–1.39 Calculated ITT: RR: 0.84 95 % CI = 0.5916–1.2066
Kimani-Murage et al., 2017 Kenya	Cluster RCT	Pregnant women without disability, e.g. intellectual impairment	Community health workers conduct face-to-face home visit based on stages of change model to provide specific maternal infant and young child nutrition messages (n = 529) AN + PN	Community health workers provide home visit with standard care (n = 581)	Prevalence of EBF at 6 months (primary)	Reported I: 232/420, C: 250/458; Odds ratio = 1.03 (0.48–2.20), p = 0.941; Adjusted odds ratio = 1.11 (0.61–2.02), p = 0.718 Calculated ITT: RR: 0.803; 95 % CI = 0.7072–0.9128; p = 0.0008
Kirkwood et al., 2013 Ghana	Cluster RCT	No specific information	Community-based surveillance volunteers provide face to face home visit, education, and support (n = 8035) AN + PN	Services provided by all the health facilities in the trial area (n = 8294)	All-cause neonatal mortality rate (primary) EBF rate for 26–32 days (secondary)	Reported I: 86.1 %, C: 79.6 %; RR: 1.10; 95 % CI = 1.04–1.16
Le Roux et al., 2013 South Africa	Cluster RCT	At least 18 years old, 26.1 % of samples have HIV	Community health workers provides face-to-face home visit (n = 646) AN + PN	Access to healthcare at government clinics and hospitals e.g. rapid HIV testing. Women living with HIV were routinely offered HIV care (n = 546)	Maternal and infant well-being - EBF rate first 6 months (primary)	Reported I: 59/608 (10.3 %), C: 15/509 (3.1 %); Odds ratio: 3.59 (1.91, 6.75); p < 0.001 Calculated ITT: RR: 3.33; 95 % CI = 1.9097–5.7989
Leite et al., 2005 Brazil	RCT 2-arm	Lower socio-economic class, with singleton	Peer supporters with breastfeeding experience provide face-to-face home visit (n = 503) PN	Local health service facilities' services in case of any health problems (500)	EBF rate at 4 months (primary)	Reported I: 124/427; C: 97/432, p = 0.03 Calculated ITT: RR: 1.27 95 % CI = 1.0045–1.6075
Maldonado et al., 2020 Western Kenya	Cluster RCT	≤32 gestational weeks at recruitment	Community Health Volunteer and mentor mothers conducted Chasmas, a group-based educational program in a face-to-face manner (n = 996) AN + PN	Data collection and encouragement provided by Community Health Volunteer (n = 924)	Facility-based delivery (primary) EBF for 6 months (secondary)	Reported Adjusted with imputation adjusted odds ratio 1.77 (1.12, 2.80); p = 0.014; RD: 11.96 % (6.8–17.0 %) Calculated ITT: I: 521/822, C: 383/728 RR: 1.20 95 % CI = 1.1051–1.3134
Martinez-Brockman et al., 2018 United States	RCT 2-arm	Low-income and minority mother, aged ≥18 years, singleton	Peer supporter with breastfeeding experience provided educational and encouraging short message service, that is based on Health Action Process Approach to behavior change (n = 114)	Standard of care of Women, Infants, and Children Loving Support BF peer counseling program (n = 98)	Early contact between participants and their peer counselors (primary) EBF at 3 months postpartum (secondary)	Reported I: 22/67, C: 19/62; p = 0.79; Adjusted odds ratio: 1.2, 95 % CI = 0.54–2.66 Calculated ITT:

			AN + PN			I: 22/106, C: 19/90; Calculated RR: 0.98; 95 % CI = 0.5696–1.6968
Md Monoto et al., 2020 Malaysia	RCT 2-arm	Singleton vaginal delivery at a Baby-Friendly Hospital Initiative hospital	Peer supporter with breastfeeding experience provide phone contact for support (n = 105) PN	Routine breastfeeding care from professionals (n = 105)	EBF rate at 6 months (primary)	Reported I: 28/60 (46.7 %), C: 18/56 (32.1 %); p = 0.035 Calculated ITT RR: 1.5556; 95 % CI = 0.9186–2.6342
Mituki-Mungiria et al., 2020 Kenya	Cluster RCT	Mom > 18 years old, with singleton that weigh > 2.5 kg.	Community health workers provide face-to-face home visits that provide problem-solving skills and psychological support (n = 263) AN + PN	Usual routine care from the health facilities (n = 263)	Prevalence of EBF at 6 months (primary)	Reported I: 45.3 %, C: 15.0 %; Adjusted χ^2 test (χ^2 = 17.725, p = 0.000) Calculated ITT: I: 176 × 0.453 = 80; C: 255 × 0.15 = 38; RR: 2.44; 95 % CI = 1.7343–3.4333
M'Liria et al., 2020 Kenya	Cluster RCT (3 arms)	3rd trimester mother tested HIV negative	Face-to-face ground discussion in a health facility Arm 1: Conducted by trained Mother-to-mother Support Groups' Facilitators (n = 82) Arm 2: Conducted by the above-mentioned facilitators, researcher, and a volunteer mother with experience in soap making (n = 88) AN + PN	Standard infant and young child nutrition/health education offered at health facilities by the nurse-in-charge (n = 79)	EBF prevalence at six months (primary)	Reported Group discussion group vs control group: {RR: 1.89; CI = 1.02–3.49; p = 0.033} Group discussion plus an income generating activity group vs control group: {RR: 2.42; CI = 1.36–4.28; p = 0.004} Group discussion plus an income generating activity vs group discussion group: {RR: 1.28; CI = 0.9–1.83; p = 0.174}
Morrow et al., 1999 Mexico	Cluster RCT (3-arm)	All pregnant women residing in the study area	Female layperson provides face-to-face home visit 6 visit group (n = 44) 3 visit group (n = 52) AN + PN	Mothers with lactation problems referred to their own physicians (n = 34)	EBF rate at 3 months (primary)	Reported 6-visit: 28/42; 3-visit: 25/50; C: 4/33; p < 0.001 Calculated ITT: 6-visit: RR 5.41, 95 % CI = 2.1415–14.1257; 3-visit: RR 4.09, 95 % CI = 1.5801–10.7689
Muirhead et al., 2006 Scotland	RCT 2-arm	Pregnant women at 28 weeks gestation	Peer supporter with breastfeeding experience conduct home visit and phone contact (n = 112) AN + PN	Normal breastfeeding support (n = 113)	Differences in breastfeeding initiation and duration (primary) EBF rate at 16 weeks (secondary)	Reported I: 2/112 (1.8 %), C: 0/113 (0); Difference (%) = 1.8; 95 % CI = −0.7–4.2
Ochola et al., 2013 Kenya	Cluster RCT (3-arm)	HIV negative mothers in third trimester	Female layperson conducted face-to-face home visit: Facility-based group: one-on-one counseling (n = 120) Home-based group: similar content, with more practical exposure such as attachment and position of baby (n = 120) AN + PN	No counseling; usual standard health and nutrition education (n = 120)	EBF prevalence at 6 months (primary)	Reported Facility-based group: 8/87 (9.2 %); Home-based group: 21/89 (23.9 %); C: 5/89 (5.6 %) Facility-based group vs control: adjusted RR = 1.53, 95 % CI 0.87–2.68, p = 0.138 Home-based group vs control: adjusted RR = 4.01, 95 % CI 2.30–7.01, p = 0.001
Reeder et al., 2014 United States	RCT 3-arm	Women who intended to/undecided over	Peer supporter with breastfeeding experience conduct phone contact Low frequency group: 4 calls from AN to	The standard Women, Infants, and Children breastfeeding promotion and support	EBF rate at 6 months (primary)	Reported RR = 1.01 95 % CI = 0.85–1.20;

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Table 1 (*continued*)

Study Country	Study design	Participant characteristics	Intervention and timing of support	Control	Outcome (primary or secondary)	Effect size (RR)
		breastfeeding	2 weeks postpartum (n = 625) High frequency group: 8 calls from AN to 4 months postpartum (n = 625) AN + PN	(n = 635)		Risk difference 0.00 Duration analysis: adjusted RR = 0.96 (0.88–1.05); Risk differences: −0.01
Samburu et al., 2020 Kenya	Cluster RCT	15–49 years old mother in 1st or 2nd trimester	Community Health Volunteer provide face-to-face home visit (n = 378) AN + PN	Standard health education and HIV counseling if tested positive (n = 523)	EBF rate at 6 months (primary)	Reported HIV negative mothers: p = 0.001, RR = 2.00; 95 % CI = 1.72–2.19
Sikander et al., 2015 Pakistan	Cluster RCT	Married, in 3rd trimester	Community health workers provide face-to-face home visit (n = 181) AN + PN	Received the exact same number of visits as the intervention arm, but by routinely trained Lady Health Workers (n = 177)	EBF rate at 6 months (primary)	Reported I: 59.6 %, C: 28.6 %; p = 0.001; HR: 0.40; 95 % CI: 0.27–0.60 Calculated ITT: I: 181 × 59.6 % = 108; C: 177 × 28.6 % = 51; RR: 2.07; 95 % CI = 1.5956–2.6876
Srinivas et al., 2015 United States	RCT 2-arm	Pregnant women ≥28 weeks' gestation	Peer supporter with breastfeeding experience provide counseling via clinic visit or phone contact (n = 60) AN + PN	Standard care (n = 50)	EBF rate at 6 months (primary)	Reported I 2 %, C 4 %; p = 0.51; RR 0.47; 95 % CI = 0.05–4.89
Talukder et al., 2017 Bangladesh	Cluster RCT (3-arm)	All mothers with infants aged 0–6 months	Traditional birth attendants or community volunteers Without supervision: face-to-face home visits (n = 400at baseline; 358 at endline) Under field supervisor: when interventionists were supervised by field supervisor (n = 358 at baseline; 353 at endline) AN + PN	No intervention (n = 461 at baseline; 437 at endline) The baseline and endline participants were different.	Initiation of early breastfeeding (primary) EBF prior 24-h to interview - for children at 0–6 months of age (secondary)	Reported Without supervision: 271/356 (76 %) Under field supervisor: 291/352 (83 %) C: 290/432 (67 %) No significance after adjusted for the covariates
Tylleskär et al., 2011 Burkina Faso, Uganda, South Africa	Cluster RCT	Singleton livebirth with no severe malformation	Community health workers provide face-to-face home visits (n = 1323) AN + PN	Burkina Faso and Uganda: standard health care only South Africa: peer counselor visits, but focus on obtaining birth certificates and social welfare grants (n = 1256)	Prevalence of EBF at 24 weeks - 24 h recall (primary)	Reported Burkina Faso: RR 3.33; 95 % CI = 1.74–6.38 Uganda: RR 3.83; 95 % CI = 2.97–4.95 South Africa: RR 5.70; 95 % CI = 1.33–24.26
Wong et al., 2007 Hong Kong	RCT 2-arm	Healthy with vaginal delivery of a full-term healthy infant	Peer supporter with breastfeeding experience provide in-hospital visit and phone contact (n = 100) PN	Usual postnatal care and breastfeeding advice. No contact from peer supporter (n = 100)	EBF rate at 6 months (primary)	Reported I: 2/100, C: 1/100; Unadjusted odds ratio: 2.02; 95 % CI = 0.18–22.7; p = 0.35

Notes: AN, antenatal; BF, breastfeeding; C, control group; EBF, exclusive breastfeeding; I, intervention group; ITT, intention-to-treat; PN, postnatal; RCT, randomized controlled trial.

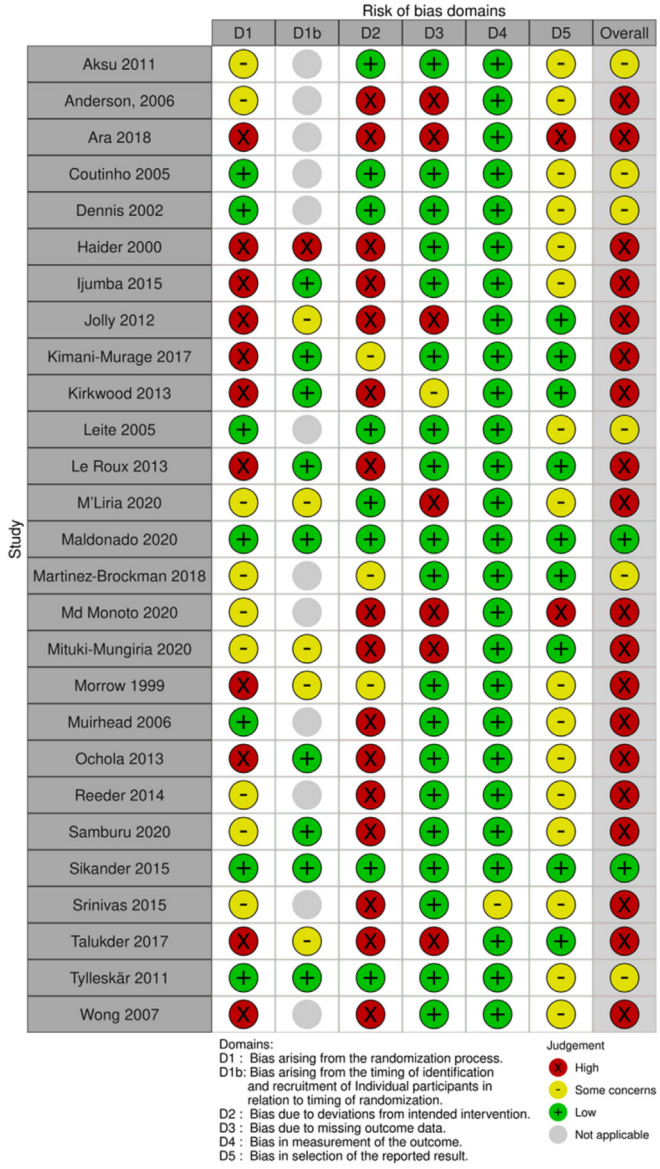

Fig. 2. The methodological quality summary of included studies.

and support provided to new mothers soon after childbirth. This early contact is pertinent to promoting exclusive breastfeeding, as a social support network can help build the new mother's confidence, normalize breastfeeding behaviors, and facilitate timely intervention. The exclusive breastfeeding rate was examined in ten studies at 3–6 months and 17 studies at ≥6 months. Compared to women in the control groups, participants who received layperson intervention had higher exclusive breastfeeding rates at the two time points assessed (at 3–6 months: RR = 2.72; 95 % CI: 1.78–4.17, $p < 0.001$; at ≥6 months: RR = 2.06; 95 % CI: 1.59–2.68, $p < 0.001$) (Fig. 3).

4. Discussion

4.1. Interpretation of findings

In this meta-analysis, we found that layperson's interventions in the form of home visits had a statistically significant impact on exclusive breastfeeding rates. The majority of the reviewed studies indicated that effective home visit interventions should be implemented in both the antenatal and postnatal periods (perinatal period). This serves as additional evidence to support a previous Cochrane review that found no evidence of antenatal breastfeeding education promoting exclusive breastfeeding duration at 6 months (Lumbiganon et al., 2016). The content of the home visits focused on providing breastfeeding education antenatally, along with problem-solving skills and psychological support for mothers postnatally. This multifaceted approach, which addressed both the prenatal and postpartum periods, was found to be the most effective in promoting exclusive breastfeeding based on the study's results. The reviewed studies had a wide range of intensities, with home visits ranging from at least 3 times to a maximum of 15 times. Therefore, it was difficult to conclude the optimum number of contact times, but the reviewed studies reported effectiveness when home visits were delivered up to 6 months postpartum or earlier. This is consistent with a previous review that suggested low-certainty evidence supporting the idea that increasing the frequency of home visits might improve exclusive breastfeeding rates (Yonemoto et al., 2021). In this review, it was also not possible to determine the intensity of effective home visits, but all home visits were optimally delivered before or up to 6 months postpartum.

Four out of fifteen studies (Anderson et al., 2005; Ara et al., 2018; Haider et al., 2000; Leite et al., 2005) reported effective home visits where the providers were trained peer supporters with breastfeeding experience, and the training lasted for at least 20 h, focusing on breastfeeding counseling skills. Five of the fifteen studies involved women with breastfeeding experience, and these studies (Ijumba et al., 2015; Le Roux et al., 2013; Sikander et al., 2015; Mituki-Mungiria et al., 2020; Samburu et al., 2020; Tylleskär et al., 2011) were conducted in low- to moderate-income countries. Therefore, in these countries, community health workers or volunteers were often recruited as home visit providers and received training in breastfeeding education, counseling skills, or behavior change techniques. The remaining studies (Coutinho et al., 2005; Morrow et al., 1999; Kirkwood et al., 2013; Ochola et al., 2013) recruited non-specific layperson for providing home visits, and prior breastfeeding experience was not necessary. Therefore, while women with their own breastfeeding experience may not be essential for an effective home visit, appropriate training is crucial.

In addition to the fifteen reviewed studies that reported effective home visit interventions, three other studies (Dennis et al., 2002; M'Liria et al., 2020; Maldonado et al., 2020) reported positive results. However, the interventions, providers, control groups, and timing of outcome measurement varied among these studies. Therefore, it is limited to concluding about the effectiveness of interventions other than home visits.

Conversely, studies have shown that home visits conducted by layperson, whether with or without breastfeeding experience and focusing on antenatal breastfeeding education, postnatal problem-solving skills, and psychological support, could be associated with sustaining exclusive breastfeeding.

4.2. Methodological critiques of included studies

The overall methodological quality of the reviewed studies was low, primarily due to biases arising from the randomization processes. A majority of the studies had a high risk of bias in terms of concealing the allocation sequence, while others raised some concerns. Since many of the studies were cluster randomized controlled trials, the failure to conceal the allocation sequence until clusters were enrolled and assigned to interventions may have contributed to these biases. Timing bias in participant recruitment was also considered, and it was found that only one of the reviewed cluster randomized controlled trials had a high risk of bias related to the selection of individual participants being influenced by knowledge of the assigned intervention.

Furthermore, non-adherence to the intervention was another potential source of bias in the reviewed studies. Twenty-two studies had low adherence to the interventions or provided no information on adherence, such as the exact number of supports received or attended by the women. Unfortunately, appropriate analyses to estimate the effect of adherence were not used in these studies with a high risk of

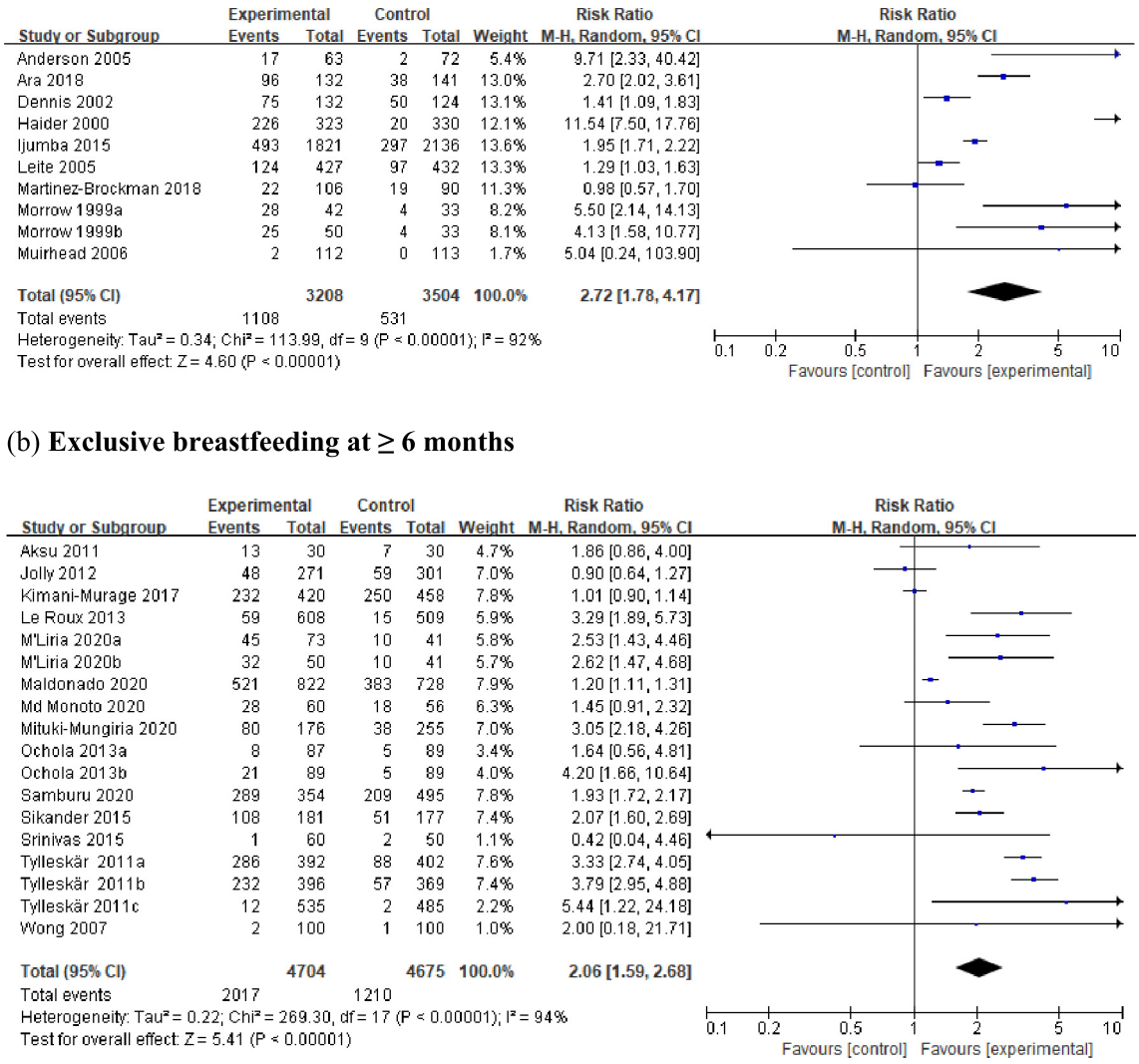

Fig. 3. (a) Exclusive breastfeeding at 3–6 months.
(b) Exclusive breastfeeding at ≥6 months.

bias. Among these studies, only three (Tylleskär et al., 2011; Aksu et al., 2011; Morrow et al., 1999) employed appropriate analyses, such as sensitivity analysis, to ensure a robust evaluation of the effect.

Another concern was the missing outcome data. The majority of the reviewed studies had a low risk of bias in missing outcome data, while seven studies had a high risk of bias in this area. This incomplete outcome data was primarily due to a higher number of participants lost to follow-up, with women who had stopped breastfeeding being more likely to miss the follow-up. To mitigate bias in this domain, we sought data analyzed using intention-to-treat principles or calculated the effect size based on intention-to-treat. However, it is important to note that this approach may dilute the effect of the intervention.

Although there is a potential risk of bias due to the practical limitation of blinding participants to the interventions and self-reported nature of the exclusive breastfeeding status outcome, the bias in outcome measurement was likely limited. Unlike subjective measures, such as reporting pain levels, which could be influenced by knowledge of the received intervention, the exclusive breastfeeding status is less likely to be affected by such bias. Therefore, nearly all of the reviewed studies had a low risk of bias in outcome measurement.

4.3. Strengths & limitations

The strength of this meta-analysis is that it is the first evaluation of the effectiveness of layperson interventions in sustaining exclusive breastfeeding. However, only English literature was reviewed, so there may be evidence in other languages that was not evaluated. In addition, there were wide diversities in the intensity and duration of the interventions, which made it difficult to identify the key elements. The majority of the participants were limited to low-income and low-educational backgrounds. The heterogeneity of the included studies limits the ability to pool the results and draw definitive conclusions. Further limitations include the heterogeneity of the studies in the meta-analysis, such as variation in intervention strategies (components, intensity, duration, provider training), control conditions, and measurement methods and time points for exclusive breastfeeding outcomes. These sources of heterogeneity make it challenging to pool the results and determine the most impactful intervention approach. Further comparative analysis is needed to identify the most effective intervention elements and characteristics.

4.4. Implications for future research

There is a growing demand for layperson support to sustain breastfeeding, coinciding with an increased initiation rate of breastfeeding. This demographic homogeneity may present challenges in extrapolating the effectiveness of these breastfeeding interventions to more diverse populations, such as those with higher socioeconomic status or from different cultural or ethnic backgrounds. Future research should aim to evaluate these breastfeeding support programs in more diverse populations, including participants from a wider range of socioeconomic, educational, and cultural backgrounds. Further research can examine the optimally feasible number of home visits or other forms of support. Furthermore, as there are more women with higher education levels and more working mothers nowadays, especially in developed and high-income countries compared with those in the included studies, more research can be conducted to investigate the different needs of these women when implementing layperson support. With regard to methodological quality, further studies should consider minimizing the risk of bias by concealing the allocation sequence. Additionally, designing strategies to enhance women's adherence to the interventions or conducting studies that employ appropriate analyses to estimate the effect of adherence is favorable for collecting evidence with a lower risk of bias.

4.5. Implications for practice

Incorporating perinatal home visits by layperson is effective in supporting women in enhancing breastfeeding knowledge antenatally, solving practical hands-on problems and overcoming breastfeeding challenges in the postpartum period, as well as providing emotional support. These hands-on problems include breastfeeding latch and position, breast or nipple pain, milk supply concerns, and engorgement. It is beneficial to help women sustain exclusive breastfeeding until 6 months postpartum. Our finding implies that trained layperson, regardless of their breastfeeding experience, can work alongside health professionals to alleviate manpower shortages and respond to the high demand for reducing women's obstacles to continuing breastfeeding.

5. Conclusion

Home visits conducted by layperson can be an effective breastfeeding intervention for women, especially those with low-income and low educational backgrounds, to improve exclusive breastfeeding rates. Layperson, regardless of their own breastfeeding experience, can provide support during the perinatal period by delivering antenatal breastfeeding education, postnatal problem-solving skills, and psychological support, provided they receive adequate training. The duration of support may be up to 6 months postpartum or less, as this timeframe has been shown to facilitate the continuation of exclusive breastfeeding.

Further high-quality research studies are needed to evaluate the effectiveness of layperson-based interventions and determine the optimal duration of exclusive breastfeeding. These studies should provide valuable insights into refining and optimizing breastfeeding support strategies.

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Registration

The protocol of this review is registered on PROSPERO (registration number: CRD42021235078).

CRediT authorship contribution statement

Harmony Mang Yan Ho: Writing – original draft, Methodology, Formal analysis, Data curation. **Heidi Sze Lok Fan:** Writing – original draft, Methodology, Formal analysis. **Gunther Huagang Hu:** Formal analysis, Data curation. **Nitya Nagesh:** Formal analysis, Data curation. **Hoi Lam Ip:** Writing – review & editing. **Emily Tsz Yan Leung:** Formal analysis, Data curation. **Edmond Pui Hang Choi:** Writing – review & editing. **Kris Yuet Wan Lok:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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