SYSTEMATIC REVIEW

Effectiveness of Intervention Methods on Exclusive Breastfeeding among Antenatal and Postnatal Mothers: A Systematic Review

Farahana Mohamad Pilus, Jacinta Mary Rajan, Nor Afiah Mohd Zulkefli, Halimatus Sakdiah Minhat, Norliza Ahmad

Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

ABSTRACT

Introduction: The universal truth surrounding the benefits of exclusive breastfeeding has seldom been disputed. However, the success of exclusive breastfeeding has not been guaranteed despite the availability of numerous interventions. The objective of this study is to review the effectiveness of various breastfeeding promotion education delivery methods in promoting exclusive breastfeeding. **Design:** A systematic search of leading databases was conducted for scholarly peer-reviewed randomized trials published between January 2014 and May 2019. **Data sources:** Eight articles were identified as relevant, all were published in English and assessed exclusive breastfeeding. **Review Methods:** Articles were analyzed for overall quality of evidence using the PEDro Scale. **Results:** A significant increase in the duration of exclusive breastfeeding was found in seven of the eight studies, with three interventions using combination verbal and written delivery methods and four interventions delivered verbally. **Conclusion:** Verbal delivery method was the most effective method and many studies use combination method of verbal and written to achieve the objective of their studies.

Keywords: Antenatal mother, Breastfeeding mother, Postpartum mother, Strategy delivery, Exclusive breastfeeding

Corresponding Author:
Nor Afiah Mohd Zulkefli, PhD
Email: norafiah@upm.edu.my
Tel: +603-97692536

INTRODUCTION

Breastmilk is an ideal source of nutrients for infants up to six months of age, and infants should therefore be exclusively breastfed during this period to attain optimal health, growth and development (1). Complementary feeds of adequate nutrition should be provided to infants after six months in addition to breastmilk for up to two years of age or beyond (2). Even though the worldwide exclusive breastfeeding rate is aimed at 70% by 2030, the current figure is a mere 41% (3).

In addition to health-related advantages, breastfeeding also offers environmental and economic benefits to all parties (3). Evidently, if 90% of mothers complied by the guidelines for exclusive breastfeeding, some 820,000 infants' lives could possibly be saved globally (4). Almost 12% of deaths for those under five years of age are likely to be prevented if exclusive breastfeeding is practices all-around the world (5). Apart from enabling children to survive as well as defending them from potentially lethal and chronic disease, breastfeeding promotes healthy growth and development (6). Furthermore, breastfeeding reduces the likelihood of post-partum depression and hemorrhages, breast and ovarian malignancies, cardiac diseases and type 2 diabetes mellitus (6).

Despite a significant amount of exclusive breastfeeding research, the rates recommended by the World Health Organization (WHO) have not yet been reached due to mother or child illness, third-party recommendations, false beliefs, as well as poor breastfeeding practices, among others, which contribute to non-exclusive breastfeeding (7). Additionally, socioeconomic discrepancies with regards to childhood nutrition also exert changes in breastfeeding practices within 12 - 24 weeks post-partum (8).

Increasing breastfeeding exclusivity and duration remains an ongoing challenge even though numerous world-wide steps and actions are taken to expand breastfeeding practices. The appropriate choice of delivery method in nutrition education is crucial to achieve at least six months of exclusive breastfeeding according to several studies (9, 10). Delivery method is the format by which the information required in an intervention is dispersed to its audience of choice (11). Various delivery methods can be implied such as internet resources, group education, one-to-one, written, verbal (12), online and in person delivery (13) and face-to-face

or over the telephone (14).

Delivery methods are affected by emerging technologies (15). The Fourth Industrial Revolution, which we are currently experiencing, is a fresh period that shapes and extends the influence of digitization in different and unforeseen ways (15). It is therefore essential to take some time to ruminate exactly what kind of shifts we are facing in terms of delivery methods for intervention in promoting exclusive breastfeeding practices among current mothers (15). Digital media is progressively becoming the main driver of our individual and public lives and it connects people to individuals and groups in new ways (15, 16). Furthermore, such connections may surpass many traditional boundaries of delivery methods for health interventions (15, 16).

For developed countries, successful delivery methods included telephone counselling, face-to-face postpartum breastfeeding teaching and delivery of information orally and on paper throughout the prenatal and postpartum phases (17). For developing countries, both verbal and written delivery methods have shown good outcomes toward an exclusive breastfeeding rate as well (7, 18-20). For underdeveloped countries, one-to-one and verbal counselling have facilitated improvements in exclusive breastfeeding rates (21). One way or another, tools of technology can become literally embedded in these methods of delivery (15).

This review covers the need for current information on the most effective delivery method used in interventions as there is a growing change of information dissemination in recent years. Additionally, to our knowledge, no other reviews have been conducted with the sole objective of determining the optimal method for delivering interventions to achieve a successful six-month exclusive breastfeeding rate. Thus, the purpose of this paper is to determine the effectiveness of various breastfeeding intervention delivery methods in encouraging mothers to practise exclusive breastfeeding for the first six months after birth.

METHODS

Research question

This systematic review is guided by one central research question, what is the most effective education delivery method on exclusive breastfeeding among mothers during antenatal and postnatal periods? The formulation of the research question for this study was based on PICO mnemonic. It has been used most frequently in quantitative systematic reviews and centred on four key concepts: Population or Problem, Intervention or Exposure, Comparison and Outcome Measures. Based on these principles, in which the comparison aspect is not applicable, studies must include three main aspects in the review, namely mothers during antenatal and postnatal periods (Population or Problem), education delivery method (Intervention or Exposure) and exclusive breastfeeding (Outcome Measures).

Eligibility

Inclusion criteria include: English language articles only, randomised controlled trials, general population of pregnant mothers (e.g. excluding HIV-infected pregnant mothers) and those more than 19 years old. In terms of intervention types, delivery methods (e.g. internet resources, group education, one-to-one, written, and verbal) and the ones that took place both during the antenatal and postnatal period were included. To consider an outcome of a delivery strategy a success would be the goal accomplishment of full breastfeeding throughout newborns' first half year when compared to the control group in particular research.

Study selection

The electronic search was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (2009) (22). The flowchart depicting the study selection process is shown in Figure 1. The search procedure incorporated title and abstract examination, accordingly. In the event that the title and the abstract did not identify with the objective of the study, the articles were unaccounted to be reviewed further. At this point, the study excluded articles from dissertations and theses, review papers, abstracts, as well as, conference proceedings. Reviews of programmes on exclusive breastfeeding or joined with other behavioural transformations, for instance, early cessation of breastfeeding were conducted. The delivery methods included were written, verbal, one-to-one, group education and internet resources (Figure 1).

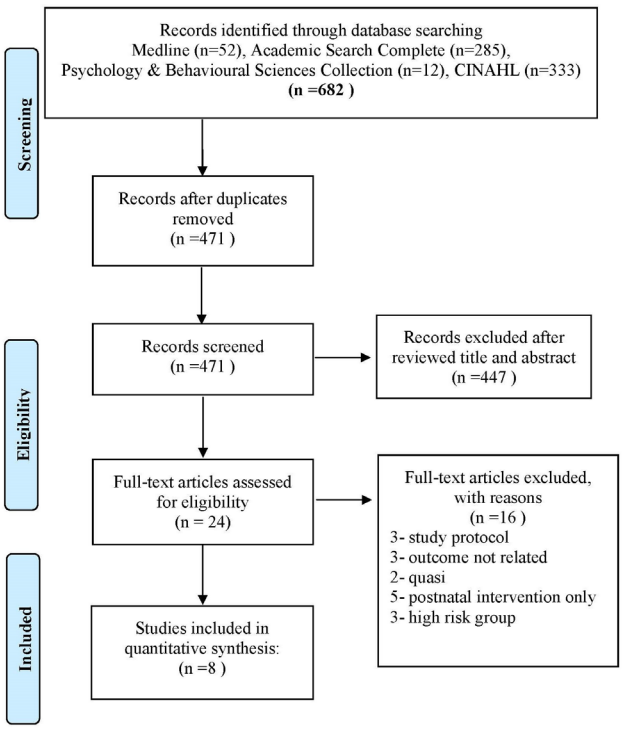

Figure 1: PRISMA systematic search record

Search Strategy

Via these search engines and databases: Academic Search Complete, CINAHL Plus with Full Text, MEDLINE Complete and Psychology and Behavioral Sciences Collection, a literature review was carried out. All the databases were accessed via EBSCO service. The search algorithm employed combined population-setting terms (e.g. "antenatal mother" OR "breastfeeding mother" OR "postpartum mother" OR "pregnant mother" OR breastfeeding OR "postnatal mother"), intervention terms (e.g. "method of delivery" OR "strategy delivery" OR "health communication" OR "health education" OR "delivery tools" OR approach OR intervention), and outcome terms (e.g. "exclusive breastfeeding" OR "six months breastfeeding" OR "full breastfeeding") in abstract (see Table I). The search mainly focused on any full-text research article published in English between January 2014 and May 2019.

TABLE I: Search strategy used in databases

Dates From January 2014 to May 2019
1. "antenatal mother"
2. "breastfeeding mother"
3. "postpartum mother"
4. "pregnant mother"
5. breastfeeding
6. "postnatal mother"
7. (or/1-6)
8. "method of delivery"
9. "strategy delivery"
10. "health communication"
11. "health education"
12. "delivery tools"
13. approach
14. intervention
15. (or/8-14)
16. "exclusive breastfeeding"
17. "six months breastfeeding"
18. "full breastfeeding"
19. (or/16-18)
20. (7 and 15 and 19)
21. limit to English language

Data collection

A reviewer screened the title, the abstract, and the full text of each article gained from the search. Then, a second reviewer evaluated the gathered articles for their suitability to confirm rigour. The review done on the gathered articles was in accordance to the objectives as the following: varied delivery approaches, for example, written, verbal, one-to-one, academic group, and web resources of interventions in breastfeeding to encourage mothers to exercise exclusive breastfeeding for half a year and the expected outcome assessed. We obtained the following data: first author's name, year of publication, country, intervention, method of delivery (e.g., written, verbal, one-to-one, group education, and internet resources), participants, providers and outcomes. There had been no contact with the researchers to obtain additional information.

The PEDro scale, a standardised quality assessment tool, was used to evaluate the methodological rigour of the included studies (23). The eleven criteria used to determine the level of quality were as follows: (i) Was eligibility criteria specified? (ii) Were subjects randomly allocated to groups? (iii) Was allocation concealed? (iv) Were the groups similar at baseline with regards to the most important prognostic indicators? (v) Was there blinding of all subjects? (vi) Was there blinding of all therapists who administered the therapy? (vii) Was there blinding of all assessors who measured at least one key outcome? (viii) Were measures of at least one key outcome met by more than 85% of the subjects initially allocated to groups? (ix) Did all subjects with outcome measures receive treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by "intention to treat"? (x) Were the results of between-group statistical comparisons reported for at least one key outcome? (xi) Did the study provide both point measures and measures of variability for at least one key outcome? Some studies lack information to describe allocation concealment and blinding. Methodologically, studies scoring 9-10 on the PEDro scale were deemed to be of "excellent" quality, those scoring 6–8 were deemed to be of "good" quality, those scoring 4 or 5 were deemed to be of "fair" quality, and those scoring less than 4 were deemed to be of "poor" quality (23).

Data analysis

We used a narrative approach to synthesise data from the included studies. Meta-analysis of similar investigations was not carried out because of the variations in the interventions and means of outcome. We analysed our data according to the following information: country, intervention, method of delivery (e.g. written, verbal, one-to-one, group education and internet resources), participants, provider and outcome. All discrepancies between the reviewers regarding the study selection process, data extraction, synthesis, and interpretation were discussed to reach a final agreement.

RESULTS

General description

Initially, 682 articles were identified from four databases (Figure 1). From this, a mere 16 complied with the inclusion criteria and were evaluated accordingly. A total of eight articles were rejected due to the following reasons: intervention postnatally only, participants were of a specific target population, study protocol, outcome was not related and quasi experimental. Hence, only eight articles were used in the final phase of analysis

(Table II).

The eight studies were carried out in seven different countries. Two of them took place in China.

Risk of bias

The risk of bias in each article varies significantly, as we have chosen articles that adhere strictly to randomised controlled trial protocols. While assessing for the quality of evidence using PEDro, the biases were noted as well. Selection bias was reduced in three of the studies by allocation concealment (24, 26, 27). Single blind trials (in which only the investigator or the patient is blind to the allocation) and open (non-blind) trials are occasionally unavoidable and single blinding took place in only one study (26, 29) .

Delivery methods

The interventions were delivered in several methods. Details of delivery methods (verbal, written, one-to-one, group education and internet resources) are shown in Table III. All eight studies had verbal delivery as one of their methods (7-9, 24-28). Peer counselling, breastfeeding educational talk, presentation materials, exchanges of experiences, and role-playing exercises are all verbal deliveries. Four of the interventions used written delivery (7, 24, 25, 27). These include daily text messages (25). Other examples of written material were flipcharts, hand-outs, training manual guides and pamphlets (7, 24, 25, 27).

One-to-one was the delivery method of choice for five studies (7-9, 25, 27). Four studies had group education (7, 24, 26, 28). One of the studies used both one-to-one and group education (7). Training sessions were conducted as a group which participants could liaise with the researchers in the event of breastfeeding issues (one-to-one) (7, 24, 26, 28). In this review, there were no articles with intervention using internet resources.

In terms of duration or length of the intervention, there is two studies with a single session during antenatal period (24, 27). One study had two training sessions with each session lasting for two hours (7). There is one study where the participants received maternal meal supplement with a breastfeeding support program from the third trimester till three months postpartum (28). Two of the studies delivered their session during their third trimester till six months postpartum (25, 26). One of that study had their first session before birth, the second session immediately after birth and the remaining five sessions monthly thereafter (26). The other study does weekly cell phone counselling from the third trimester till the infant was six months old (25). This one study has the longest duration of counselling during pregnancy till 18 months postpartum (9). There is one study which provides breastfeeding support by peer counsellors but there was no mention on the frequency (8).

TABLE II: Quality assessment

No.	Author / Year	Article Title	PEDro Score
1.	Wong et al. (2015)	Antenatal Education to Increase Exclusive Breastfeeding	8
2.	Ansari et al. (2014)	The Effect of Interventional Program on Breastfeeding Self-Efficacy and Duration of Exclusive Breastfeeding in Pregnant Women in Ahvaz, Iran Somayeh	7
3.	Zhang et al. (2018)	Impact of maternal nutritional supplementation in conjunction with a breastfeeding support program during the last trimester to 12 weeks postpartum on breastfeeding practices and child development at 30 months old	6
4.	Shariat et al. (2018)	Breastfeeding Self-Efficacy as a Predictor of Exclusive Breastfeeding: A Clinical Trial.	8
5.	Sikander et al. (2015)	Cognitive-Behavioral Counseling for Exclusive Breastfeeding in Rural Pediatrics: A Cluster RCT.	
6.	Nikiиma et al. (2017)	Effectiveness of facility-based personalized maternal nutrition counseling in improving child growth and morbidity up to 18 months: A cluster-randomized controlled trial in rural Burkina Faso	7
7.	Eide et al. (2016)	Impact of a peer-counseling intervention on breastfeeding practices in different socioeconomic strata: results from the equity analysis of the PROMISE-EBF trial in Uganda	6
8.	Patel et al. (2018)	Effectiveness of weekly cell phone counselling calls and daily text messages to improve breastfeeding indicators	6

Participants

The participants for this study were recruited during their various trimesters of pregnancy. There were four studies that recruited participants during their third trimester (7, 8, 25, 28). There was only one study that recruited pregnant women before their third trimester (24). Three studies recruited general pregnant women and were not based on their trimesters (9, 26, 27). Another three studies specifically made a requirement of primiparous women (7, 24, 27).

Provider

All service providers had different types of healthcare workers except two (7, 9, 24-27). These healthcare workers included registered nurses, midwives, and non-specialist community health workers. One study was sponsored by a private healthcare company and the health education was administered by them as well (28). In another study, the service was provided by peer counsellors (8).

TABLE III. Summary of method of deliveries for intervention

No.	Author (year)	Country	Intervention	Method of Delivery					Participants	Provider	Outcome
				Verbal	Written	One-to-one	Group education	Internet resources			
1.	Wong et al. (2014)	Hong Kong	Professional one-to-one antenatal breastfeeding support and education Duration: 20 to 30 minute session	/	/	/			Primiparous women who attended the antenatal clinics	Registered nurse (completed the World Health Organization and United Nations Children's Fund breastfeeding course)	No significant differences Hazard ratio: 0.96, 95% CI 0.79–1.17
2.	Eide et. al (2016)	Uganda	Peer counsellor	/		/			Pregnant women at least 7 months pregnancy	Peer counsellor	Significant Intervention vs control 52% vs 11%
3.	(Ansari, Abedi, Hasanpoor, & Bani, 2014)	Iran	Conventional Educational program Duration: two training sessions, each lasted two hours) with two days interval	/	/	/	/		Primiparous women over 36 weeks	Midwife/ Researcher	Significant Intervention vs control 73.3% vs 2.66% (p < 0.001)
4.	Zhang et. al (2018)	Vietnam	Maternal milk supplementation (MMS) with breastfeeding support sessions	/			/		Mothers aged 21 to 35 years at 26 to 29 weeks of gestation with a pre-pregnancy body mass index (BMI)<25 kg/m2	Private health care company	Significant Intervention vs control 26.0% vs 11.5% (p = 0.0093).
5.	Shariat et al. (2018)	Iran	Educational training Duration: one training session of breastfeeding self-efficacy	/	/		/		Primiparous women before the gestational age of 21 weeks and 6 days	Health professionals	Significant Intervention vs control 36.41% vs 23.5% (p=0.015)
6.	Sikander et al. (2015)	Pakistan	Cognitive-behavioral counselling Duration: Seven sessions	/			/		Pregnant women	Non-specialist community health workers of Pakistan's Lady Health Workers (LHW) program	Significant Intervention vs control 59.6% vs 28.6% Adjusted hazard ration: 0.4 [95% CI: 0.27–0.60], p<0.001).
7.	Patel et. al (2018)	India	Cell phone counselling - weekly cell phone counselling and daily text messages	/	/	/			Pregnant women between 32–36 weeks	Certified lactation instructors (auxiliary nurse midwives with additional training for counselling over the phone)	Significant Intervention vs control 97% vs 49%, (p < 0.001).
8.	Nikiema et al. (2017)	West Africa	Facility-based personalized maternal nutrition counseling	/		/			Pregnant women	Healthcare workers trained by a paediatrician with support from an expert on patient-centred communication	Significant Intervention vs control 54.3% vs 42.3% (95% CI: 2.1-23.6; p= 0.020)

Effect of delivery methods on exclusive breastfeeding

Regardless of whether it is the primary or secondary goal of the studies, the review's desired outcome is exclusive breastfeeding for six months. The outcome measurement varied across studies. Two studies expressed the desired outcome in hazard ratio (26, 27) while the remaining studies expressed the outcome rate in percentage for both intervention and control groups (7-9, 24, 25, 28). Seven studies (7-9, 24-26, 28) demonstrated significant differences in achieving exclusive breastfeeding at six months postpartum following the intervention, while only one study demonstrated no significant differences between the intervention and control groups (27).

Successful methods of delivery on exclusive breastfeeding

Seven studies showed success in increasing exclusive breastfeeding rate at six months postpartum with p value < 0.05 as shown by Table III (7-9, 24-26, 28). Both one-to-one and group education had similar effects (7-9, 24-26, 28). The combination of delivery methods appeared to be particularly successful in all seven studies (7-9, 24-26, 28) with one study combining all four delivery

methods in the studies (verbal, written, one-to-one and group education) (7).

Unsuccessful methods of delivery on exclusive breastfeeding

Only one study demonstrated that there was no statistically significant difference in the desired outcome (27). The study's participants may have been highly motivated to breastfeed, as their baseline breastfeeding rate was 8–13% higher than that reported in previous study (27).

PEDro quality rating of evidence

All studies included were randomised controlled trials and thus have the potential to produce evidence of high quality. In this study, all studies returned a good quality rating with a score range of 6-8 (7-9, 24-28).

DISCUSSION

Different delivery methods were conducted throughout the antenatal and postnatal period. Interventions which lasted from the prenatal period onwards were significantly more effective in achieving exclusive breastfeeding for six months than those conducted pre- or postnatally alone (OR = 3.32; 95% CI: 1.83–6.03) (30). In comparison with single-setting interventions, combined-setting ones greatly improved the breastfeeding rate (28). In this study, majority of the intervention took place in health-care settings (7-9, 24, 26-28) and only one study had home intervention where cell phone counselling was used (25).

During verbal delivery, it is essential to make sure that the listeners clearly comprehend what is being said so it needs solid speaking and listening skills of the speaker (32). Verbal delivery is the most effective technique of permitting reciprocal communication dialogue (32). This can be clearly seen as a method of communication in all of the studies (7-9, 24-28). Examples of verbal delivery includes meetings, workshops, telephone calls and presentations (32).

A written method is used when you need to deliver in depth evidence such as figures and facts (31). Written material can be referred to effortlessly as it is documented and examples of written delivery methods includes email, newsletter, texts/social media, brochure, pamphlets and posters (32).

However, group education of patients costs less than the one-to-one method and is very effective (33). Further benefits include group support from other participants, queries asked by other participants that might not have been well-thought-out by each individual patient, and the demonstration of actions and abilities by the educator and by the group participants (33). Nevertheless, a discrepancy must be made between intervention delivery methods and the intervention's point of individualization (33). One-to-one is a regularly used delivery method for patient education in which one educator imparts knowledge to the patient in the clinic, or during a hospital appointment (33). One-to-one communication is particularly fitting when delicate subjects need to be talked over, but it is not economical, for it is the most laborious method for the advocator (33).

All the studies showed intervention increased exclusive breastfeeding practices except the study by Wong et al. (2014) (27). This study conducted in Hong Kong showed insignificant results despite using a combined strategy approach (27). This may suggest that the controls were contaminated with information which was supposed to be contained within the interventional group (35). Other six studies with significant result show similarities as they show patient centered communication and sustained contact with the respondent (9, 25)

Limitation

In this study, various methods of delivery had been employed which may influence the end-outcome of the intervention. Bias may have occurred as the methods and approaches used in the different interventions affect the outcomes (36). Recall bias could have manifested during the utilization of self-reported data for the breastfeeding parameters.

The outcomes of this study might not be generalizable to related conditions. Apart from that, methods of delivery should consider the hurdles to the attainment of an uninterrupted six months breastfeeding stint, examples of which include maternal employment, perception, embarrassment and lack of support from family members (17).

Future Research

Most of the study was not guided by a theoretical framework, thus study results may be limited (35). Text messaging and website access were found to be effective and are highly cost-effective initiatives that deserve further investigation and refinement (36). This is especially in line with the fact that the virtual medium affords easy transmission of message when the conventional method of delivery is no longer feasible due to COVID-19.

CONCLUSION

The findings of this review suggest that combined delivery methods (written, verbal, one-to-one, and group education) effectively increase exclusive breastfeeding rates. The integration of pro-breastfeeding strategies into healthcare practices and society could enhance the rate of exclusive breastfeeding by 2.5-folds (6).

Well-formulated training programs and manuals constitute an efficacious method for the improvement of maternal perceptions and practices with regards to

exclusive breastfeeding. Monitoring progress in reaching breastfeeding targets is essential to evaluate how their efforts have impacted behaviours. Furthermore, further research with guided theory may further enhance the effectiveness of breastfeeding interventions.

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