



RESEARCH ARTICLE

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Maternal Empowerment, Family Support, and Breastfeeding Practices: A Mixed-Methods Study in Pematangsiantar, Indonesia

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ABSTRACT

Early initiation of breastfeeding (EIBF) and exclusive breastfeeding (EBF) are vital infant-feeding practices, but their implementation can be influenced by clinical factors, healthcare routines, maternal confidence, and family environment. However, the extent to which maternal empowerment interventions improve breastfeeding outcomes in community settings remains uncertain. This study aimed to evaluate a maternal empowerment intervention in relation to EIBF, EBF, breastfeeding knowledge, and self-efficacy, and to explore perceived barriers to breastfeeding and sources of family. This convergent mixed-methods study was conducted in Pematangsiantar, Indonesia, from March to November 2024. The quantitative component used a quasi-experimental pretest-posttest control-group design involving 54 pregnant women: 27 received breastfeeding counseling, a pocketbook, video-based education, and follow-up support, while 27 received only the pocketbook. The qualitative component involved semi-structured interviews with 14 mothers. Quantitative findings were analyzed using between-group comparisons and logistic regression; interview data were examined thematically. EIBF was reported by 74.1% of the intervention group and 85.2% of the control group ($p=0.311$). EBF proportion was 70.4% in both groups ($p=1.000$). Between-group differences in post-intervention knowledge and breastfeeding self-efficacy were not significant. Cesarean delivery was associated with lower adjusted odds of EIBF (aOR = 0.047, 95% CI 0.006–0.377; $p=0.004$), while EIBF was associated with earlier lactation onset (OR = 9.0, 95% CI 2.07–39.19; $p=0.004$). Interviews identified delivery-related barriers, perceived insufficient milk, family influence, employment demands, and supportive family involvement. The intervention didn't demonstrate statistically significant improvements in breastfeeding outcomes. Breastfeeding promotion should integrate maternal education with supportive maternity-care practices and family engagement.

Keywords: Maternal empowerment; early initiation of breastfeeding; exclusive breastfeeding; family support; breastfeeding self-efficacy

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INTRODUCTION

Early initiation of breastfeeding (EIBF), conventionally defined as putting a newborn to the breast within one hour after birth, and exclusive breastfeeding (EBF) during the first six months are core recommended infant-feeding practices. Early skin-to-skin contact and timely practical assistance can help mothers initiate breastfeeding and establish lactation.¹ By 2030, the World Health Organization hopes that 70% of newborns will have initiated breastfeeding within the first hour of life.² A joint WHO–UNICEF statement in 2025 reported an estimated 47 per cent infant under six months of age are exclusively breastfeeding and 48% of newborns received breast milk within the first hour of life.¹ The percentage of early breastfeeding initiation in Indonesia was 92.5% and 69.26% for exclusively breastfeeding based on the 2024 Indonesian Health Profile.³ However, recommended practices are not determined by maternal intention alone. Their implementation also depends on the clinical circumstances of birth, maternity-facility routines, timely access to skilled breastfeeding assistance, and the support available to mothers after discharge. The implementation gap is especially relevant in Indonesia. These indicators suggest that improvements in breastfeeding continuation can coexist with substantial challenges during the immediate postnatal period. Nationally representative analyses have also linked caesarean delivery with delayed breastfeeding initiation and non-exclusive breastfeeding, indicating that feeding outcomes reflect both maternal circumstances and the organization of maternity care.⁴

Maternal empowerment programs seek to strengthen knowledge, confidence, and the ability to make informed decisions about breastfeeding. Nevertheless, improvements in knowledge or breastfeeding self-efficacy do not necessarily result in EIBF or sustained EBF if mothers face postoperative recovery, separation from the newborn, delayed skin-to-skin contact, nipple pain, concerns about milk sufficiency, or pressure from relatives to introduce formula. A Cochrane review concluded that breastfeeding support can increase breastfeeding duration and, particularly, exclusivity, but also noted uncertainty about which intervention components and delivery approaches are most effective at scale.⁵ This underscores the need to evaluate not only whether a program is associated with outcomes, but also how its effects may be shaped by the care environment and family context.

Family support is another potentially important influence. Husbands and extended family members may provide encouragement, practical help with infant care, food preparation, and reinforcement of breastfeeding advice; conversely, conflicting family recommendations can undermine maternal confidence. Recent evidence synthesis has increasingly examined father- or partner-focused support, while also noting variation in intervention design and outcome measurement.⁶ This literature supports a family-inclusive perspective but does not remove the need to investigate how support interacts with delivery-related barriers and local cultural practices in specific settings.

Despite this evidence, three connected gaps remain relevant to the present study. First, intervention evaluations often emphasize breastfeeding knowledge, self-efficacy, or feeding outcomes separately, making it difficult to understand whether changes in maternal-level measures correspond to

changes in actual EIBF and EBF. Second, quantitative outcome comparisons may identify associations with delivery mode but provide a limited explanation of how hospital practices, maternal concerns, and family advice shape feeding decisions. Third, findings from national surveys and international reviews do not directly establish whether a structured maternal empowerment package, delivered in a local Indonesian setting and accompanied by qualitative inquiry, changes breastfeeding outcomes compared with a control condition that receives educational material. These gaps are the rationale for integrating outcome comparisons with mothers' accounts of barriers and support. Accordingly, this study aimed to: (1) compare EIBF, EBF, breastfeeding knowledge, and breastfeeding self-efficacy between an intervention group receiving a package of counselling, educational materials, and follow-up support and a control group receiving a pocketbook; (2) examine factors associated with EIBF and the association between EIBF and onset of lactation; and (3) explore perceived barriers to breastfeeding and the contribution of husbands and extended family. By combining quantitative comparisons with qualitative themes, the study offers a context-specific account of both measured outcomes and the clinical, social, and family conditions that may influence breastfeeding practices.

METHOD

A convergent mixed-methods study was conducted in Pematangsiantar City, Indonesia, from February to November 2024. The quantitative component used a quasi-experimental pretest–post-test control-group design to compare breastfeeding-related outcomes between an intervention group and a control group. The qualitative component used the Rapid Assessment Procedure (RAP) to investigate mothers' experiences breastfeeding, perceived barriers, and source of support. Quantitative and qualitative data were collected concurrently and analyzed independently. The study adopted a convergent mixed-methods framework. Quantitative and qualitative findings were analysed separately and integrated during interpretation to examine how mothers' reported experiences might contextualise the measured breastfeeding outcomes. The quantitative component evaluated differences between the intervention and control groups, whereas the qualitative component explored the clinical, maternal, and social circumstances shaping breastfeeding practices. The quantitative study involved 54 pregnant women receiving prenatal care at four independent midwifery practices in Pematangsiantar City. The selection of these four practices was based on their high volume of antenatal care (ANC) visits compared to other independent midwife practices. Furthermore, the four locations represent the administrative areas of Pematangsiantar.

Participants were recruited consecutively. Eligible participants were aged 18–49 years, were in the third trimester of pregnancy, could communicate in Indonesian, and were able to provide informed consent. Both primigravida and multigravida women were eligible. Participants were assigned to an intervention group (n=27) or a control group (n=27). Exclusion criteria include twin pregnancies, a history of hypertension during pregnancy, pregnancies complicated by medical conditions, and preterm

delivery. Participation was voluntary, and participants were informed of their right to withdraw without consequences. Recruitment used consecutive sampling, a non-probability method in which every eligible woman attending a participating practice during the recruitment period was invited, in order of attendance, until the required sample size was reached. Consecutive sampling therefore determined who was enrolled; it did not determine, and is not equivalent to, randomization. In total, 54 women were enrolled and analyzed (intervention group, $n=27$; control group, $n=27$). Allocation followed the order of enrolment (sequential, non-concurrent allocation). The first 27 consecutively enrolled eligible women were assigned to the intervention group. After this quota was filled, the next 27 consecutively enrolled eligible women were assigned to the control group. Sequential allocation was chosen to limit contamination, because women attending the same practices could otherwise share the video material and counselling content. Allocation was not randomized and was concealed from the researchers or participants. Recruitment was conducted in February at the same independent midwifery practice.

The minimum sample size in this study was determined based on the Lemeshow formula for comparing two proportions:⁷

$$n_1 = n_2 = \frac{(Z\alpha\sqrt{2PQ} + Z\beta\sqrt{P_1Q_1} + \sqrt{P_2Q_2})^2}{(P_1 - P_2)^2}$$

We assumed an EIBF proportion of 0.631 (P_1), taken from Sanie et al., (2021)⁸, and proportion of 0.26 (P_2) based on clinical judgment, a two-side significance level of 5% ($Z\alpha=1.96$), and 80% power ($Z\beta=0.842$), giving $P = \frac{1}{2} (P_1+P_2) = 0.445$. The resulting minimum was 27 women per group (54 in total).

The maternal empowerment intervention comprised three breastfeeding counselling and education sessions delivered at two-week intervals. Participants in the intervention group received counselling, a breastfeeding pocketbook, and video-based educational materials addressing early initiation of breastfeeding (EIBF) and exclusive breastfeeding (EBF). The researcher conducted a counseling session lasting 20–30 minutes. During the session, the researcher discussed the contents of the pocketbook regarding early initiation of breastfeeding and exclusive breastfeeding, re-showed the video demonstrating the early initiation process, and encouraged the mothers to successfully practice early initiation and exclusive breastfeeding. A home visit was also conducted as part of the follow-up support. Maternal knowledge was assessed before and after the educational intervention. Participants in the control group received the breastfeeding pocketbook without the additional counselling and video-based educational components described for the intervention group. Accordingly, the study estimated the additional effect of the intervention package relative to the provision of written educational material, rather than comparing the package with no breastfeeding information.

Maternal knowledge of EIBF and EBF was assessed using a researcher-developed 13-item questionnaire. The questionnaire had undergone validity and reliability testing, with a reported

Cronbach's alpha coefficient of 0.785. Breastfeeding self-efficacy was assessed using the Breastfeeding Self-Efficacy Scale Short-Form (BSES-SF) with 12 questions.⁹ Early initiation of breastfeeding (EIBF) was defined as putting the newborn to the breast within one hour after birth. The study also recorded the reported duration associated with the initial breastfeeding practice. The lactation onset was classified as earlier when lactation was established < 72 hours after delivery and delayed when it occurred $\geq$ 72 hours. EBF was defined as feeding an infant exclusively with breast milk, without additional food or drink, from birth through six months of age.

Fourteen mothers were selected purposively to capture diverse experiences of the program. They included women from both study groups, women with varying levels of engagement with the program and different levels of knowledge, and women who did not practice EIBF or EBF. Recruitment continued until thematic saturation, defined as the point at which further interviews produced no new themes. Semi-structured, in-depth interviews were conducted with a flexible, pre-tested guide covering reasons for not practicing EIBF or EBF, breastfeeding difficulties, strategies for maintaining milk production, and support from husbands and extended family. Interviewers had no prior clinical relationship with the participants. Interviews took place in participants' homes to ensure privacy and lasted approximately 20–30 minutes. They were audio-recorded with written consent and transcribed verbatim in Indonesian; the extracts used in this paper were translated into English and cross-checked to preserve meaning. Transcripts were analyzed thematically. Two researchers (IM and LN) independently coded the data inductively by hand to develop an initial codebook, and discrepancies were resolved through discussion until consensus was reached. Trustworthiness was supported by peer debriefing within the research team, an audit trail of analytic decisions, and member checking, in which a summary of key findings was presented to four participants to confirm accuracy. Illustrative quotations are presented to show how themes were derived.

Quantitative data were analyzed in SPSS version 25. Participant characteristics and outcomes were summarized as means and standard deviations or frequencies and percentages. Between-group comparisons used Fisher's exact and Chi-square test for categorical variables and Mann–Whitney U test for continuous variables. Binary logistic regression was used to examine factors associated with EIBF (yes/no), with maternal age category, parity and mode of delivery entered as predictors. The selection of these predictors was based on the results of the bivariate analysis ($p < 0.25$). The association between EIBF and onset of lactation was examined with a 2×2 comparison. Results are reported as odds ratios (OR), adjusted odds ratios (aOR), 95% confidence intervals (CI) and p values, with $p < 0.05$ considered statistically significant. Qualitative data were analyzed thematically as described above. For integration, quantitative results and qualitative themes were arranged side by side in a joint display (Table 7), and meta-inferences were classified as convergence, divergence, complementarity or expansion.

The study was approved by the Health Research Ethics Committee, Health Polytechnic of the Ministry of Health, Medan (approval number 01.25 815/KEPK/POLTEKKES KEMENKES MEDAN 2024). Written informed consent was obtained from all participants before data collection.

RESULTS

Quantitative results

The selection of participants is illustrated in the following CONSORT diagram.

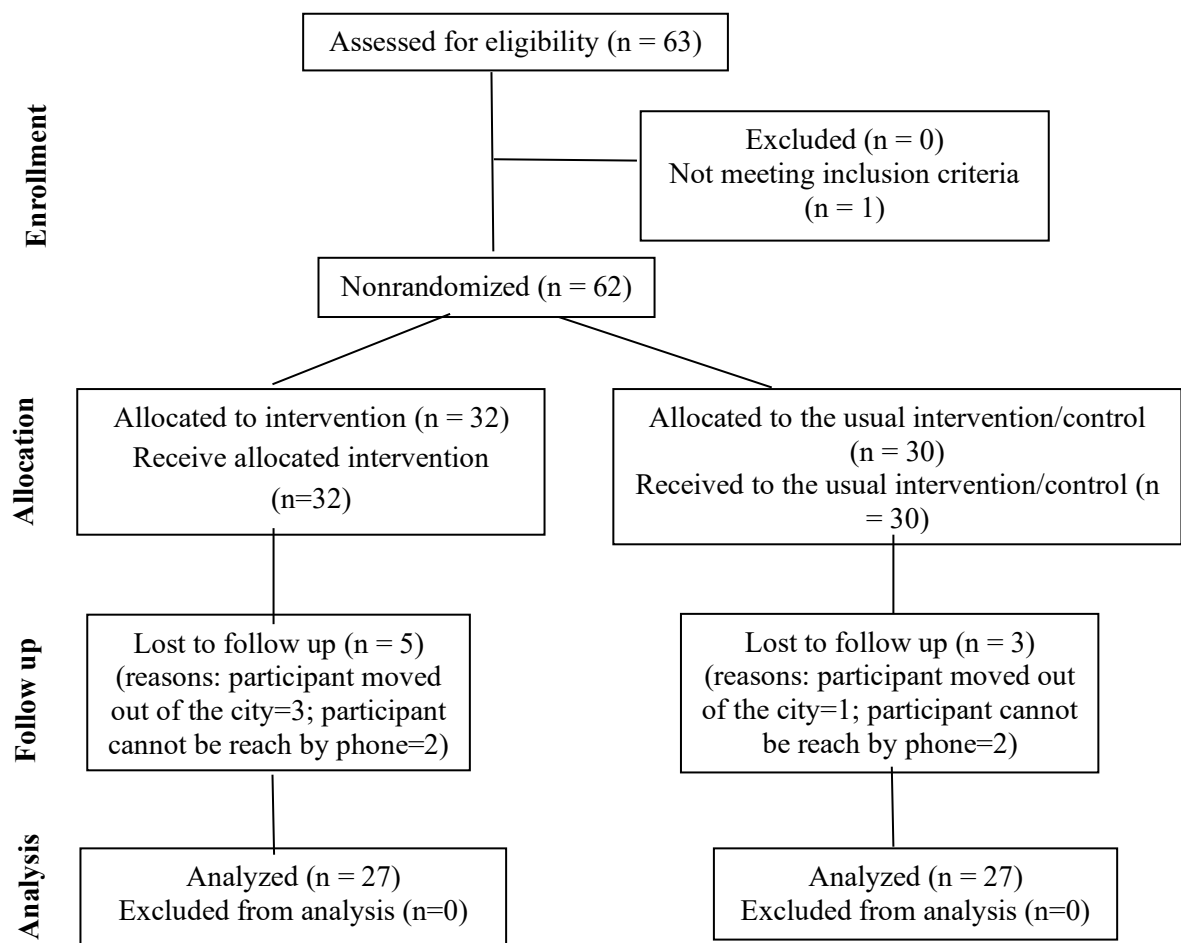


Figure 1. Flow chart of the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) diagram

A total of 54 participants were included in the univariate analysis. The demographic, clinical, and infant characteristics of the sample are detailed in Table 1. The overall mean maternal age was 28.43 ± 5.56 years. When categorized, the vast majority of mothers (88.9%) fell into the reproductive age range of 20–35 years. Regarding parity, mothers had a mean of 2.15 ± 1.03 children, with multiparous women constituting the predominant group (72.2%). The mean gestational age at the empowerment program was 34.76 ± 3.72 weeks. Ethnically, most participants identified as Batak (63.0%), followed by Javanese (29.6%) and other ethnicities (7.4%). The educational level of the respondents was predominantly high school to university education (88.9%). In terms of employment status, the vast majority of participants were housewives (90.7%). The most births occurred via vaginal delivery (83.3%). The mean of lactation was 2.65 ± 1.81 days. Furthermore, the mean score on the Breastfeeding Self-Efficacy Scale (BSES) was 57.43 ± 8.72 points. Among the infants, 55.6% were male, and the mean birth weight was 3469.07 ± 512.38 grams. For Early Initiation of Breastfeeding (EIBF), the mean duration was 17.06 ± 20.14

minutes. Overall, 79.6% of mothers successfully practiced EIBF. Additionally, 70.4% of mothers practiced exclusive breastfeeding.

Table 1. Results of univariate analysis (n=54)

Variables	Mean $\pm$ SD	f (%)
Mother's characteristics		
Gestational age (weeks)	34.76 $\pm$ 3.72	
Parity	2.15 $\pm$ 1.03	
Parity		
- Primipara		15 (27.8)
- Multipara		39 (72.2)
Age (years)	28.43 $\pm$ 5.56	
Age (years)		
- < 20 and > 35		6 (11.1)
- 20 – 35		48 (88.9)
Ethnicity		
- Batak		34 (63.0)
- Javanese		16 (29.6)
- Other		4 (7.4)
Education level		
- Elementary school - middle school		6 (11.1)
- High school – university		48 (88.9)
Employment status		
- Working		5 (9.3)
- Housewife		49 (90.7)
Type of delivery		
- Vaginal delivery		45 (83.3)
- Cesarean		9 (16.7)
Lactation onset (days)	2.65 $\pm$ 1.81	
Breastfeeding self-efficacy scale (BSES point)	57.43 $\pm$ 8.72	
Baby's characteristics		
Gender		
- Male		30 (55.6)
- Female		24 (44.4)
Birth weight (grams)	3469.07 $\pm$ 512.38	
EIBF duration (minutes)	17.06 $\pm$ 20.14	
EIBF		
- yes		43 (79.6)
- no		11 (20.4)
Exclusive breastfeeding		
- yes		38 (70.4)
- no		16 (29.6)

EIBF= early initiation of breastfeeding, BSES= Breast feeding self efficacy score

The characteristics of participants in both study groups are shown in Table 2 below.

A total of 54 participants were included in the study, allocated equally into the intervention group (n=27) and the control group (n=27). The baseline demographic and clinical characteristics of the mothers and infants are detailed in Table 2. Overall, both groups demonstrated homogenous baseline characteristics across most variables. The mean age of mothers in the intervention and control groups

was 27.81 ± 5.72 years and 29.04 ± 5.42 years, respectively ($p=0.252$), with the majority falling within the 20–35 age range in both groups (92.6% vs. 85.2%, $p=0.669$). In terms of parity, multiparous mothers predominated in both the intervention (70.4%) and control (72.2%) groups ($p=1.000$). No differences were observed regarding lactation onset (2.89 ± 1.97 vs. 2.41 ± 1.65 days; $p=0.381$), education level ($p=0.669$), ethnicity ($p=0.191$), or maternal employment status ($p = 0.351$). A statistically significant difference was observed in gestational age between the two groups ($p<.001$). Mothers in the intervention group had a lower mean gestational age (32.93 ± 3.83 weeks) compared to those in the control group (36.59 ± 2.55 weeks). Regarding neonatal characteristics, no statistically differences were found between the intervention and control groups. Most deliveries were vaginal in both groups (88.9% vs. 77.8%; $p=0.467$). Male infants accounted for 63.0% of the intervention group and 48.1% of the control group ($p=0.411$). Mean birth weights were comparable between the intervention (3458.52 ± 478.46 grams) and control (3479.63 ± 553.19 grams) groups ($p=0.881$).

Table 2. Characteristics of participants

Variables	Intervention groups (n=27)		Control groups (n=27)		p-value
Mother's characteristics	Mean	SD or %	Mean	SD or %	
Age (years)	27.81	5.72	29.04	5.42	0.252
Age (years)					
- < 20 dan > 35	2	7.4%	4	14.8%	0.669
- 20 – 35	25	92.6 %	23	85.2%	
Parity	2.11	1.21	2.19	0.96	0.595
Parity					
- Primipara	8	29.6%	7	27.8%	1.000
- Multipara	19	70.4%	20	72.2%	
Gestational age (weeks)	32.93	3.83	36.59	2.55	<0.001
Onset of Lactation (day)	2.89	1.97	2.41	1.65	0.381
Education level					
- Elementary school - middle school	2	7.4%	4	14.8%	0.669
- High school – university	25	92.6%	23	85.2%	
Ethnicity					
- Batak	20	74.1%	14	51.9%	0.191
- Javanese	5	18.5%	11	40.7%	
- Other	2	7.4%	2	7.4%	
Employment status					
- Working	4	14.8%	1	3.7%	0.351
- Housewife	23	85.2%	26	96.3%	
Baby's characteristics					
Type of delivery					
- Vaginal delivery	24	88.9%	21	77.8%	0.467
- Cesarean	3	11.1%	6	22.2%	
Gender					
- Male	17	63,0%	13	48,1%	0.411
- Female	10	37,0%	14	51,9%	
Birth weight (grams)	3458.52	478.46	3479.63	553.19	0.881

p-value: the statistical tests used Independent t-test for continuous variables, Chi-Square/Fisher's Exact test for categorical variables

The effect of maternal empowerment on the outcome can be seen in Table 3 below.

Table 3. The effect of maternal empowerment on the outcome

Variables	Intervention groups (n=27)		Control groups (n=27)		Total		OR (95% CI)	p-value
	f or mean	% or SD	f	%	f	%		
EIBF								
- yes	20	74.1	23	85.2	43	79.6	0.50	0.499
- no	7	25.9	4	14.8	11	20.4	(0.13 – 1.95)	
Exclusive breastfeeding								
- yes	19	70.4	19	70.4	38	70.4	1	1.000
- no	8	29.6	8	29.6	16	29.6	(0.31 – 3.22)	
EIBF duration (minutes)	13.41	16.14	20.70	23.21				0.674
BSES	58.48	9.07	56.37	8.37				0.379
Pre-intervention knowledge score	7.78	1.57	8.30	1.61				0.134
Post-intervention knowledge score	8.07	0.92	7.78	1.31				0.484
p-value	0.394		0.253					

EIBF=early initiation of breastfeeding; BSES= Breastfeeding self-efficacy scale

The effects of the maternal empowerment intervention on breastfeeding outcomes, knowledge scores, and breastfeeding self-efficacy are presented in Table 3. Regarding categorical outcomes, early initiation of breastfeeding (EIBF) was performed by 74.1% of mothers in the intervention group and 85.2% in the control group, yielding an odds ratio of 0.50 (95% CI:0.13–1.95, $p=0.499$). There was no effect of empowerment intervention on EIBF. In the unadjusted comparison between study groups, exclusive breastfeeding was reported by 19 of 27 participants (70.4%) in both the intervention and control groups. The between-group comparison showed no statistically significant difference (OR=1.00, 95% CI 0.31–3.22; $p=1.000$). For continuous variables, the mean duration of EIBF was 13.41 ± 16.14 minutes in the intervention group versus 20.70 ± 23.21 minutes in the control group ($p=0.674$). Baseline knowledge scores prior to the intervention were comparable between the intervention (7.78 ± 1.57) and control (8.30 ± 1.61) groups ($p=0.134$). Following the intervention, post-test knowledge scores averaged 8.07 ± 0.92 in the intervention group and 7.78 ± 1.31 in the control group ($p=0.484$). There was no difference in knowledge within the group before and after the intervention. Finally, the mean BSES score was 58.48 ± 9.07 for the intervention group and 56.37 ± 8.37 for the control group, showing no difference ($p=0.379$).

The results of the multivariable logistic regression analysis examining factors influencing the practice of early initiation of breastfeeding (EIBF) are presented in Table 4. Among the tested predictor variables (maternal age, parity, and delivery type), only mode of delivery emerged as a statistically significant predictor of EIBF practice ($p=0.004$). Mothers who underwent a caesarean section had

significantly lower odds of implementing EIBF compared to those who delivered vaginally (aOR=0.047, 95%CI: 0.006–0.377).

Table 4. Logistic regression analysis of factors associated with the practice of early initiation breastfeeding (EIBF)

Predictors	B	SE	Wald	p-value	aOR	95% CI for aOR	
						Lower	Upper
< 20 and > 35 vs. 21 – 35 years	-2.170	1.257	2.980	0.084	0.114	0.010	1.341
Primipara vs. multipara	-1.246	1.089	1.310	0.252	0.288	0.034	2.430
Cesarean section vs. vaginal delivery*	-3.048	1.057	8.310	0.004	0.047	0.006	0.377
Constant	3.447	1.523	5.120	0.024	31.398		

*Significant at $p < 0.05$

Reference categories: 21-35 years, multipara, and vaginal delivery

B=regression coefficient; SE=standard error; aOR= adjusted odds ratio; CI=confidence interval.

Conversely, maternal age (<20 and >35 years relative to 21–35 years) was not associated with successful EIBF implementation (aOR=0.114, 95%CI: 0.010–1.341, $p=0.084$). Similarly, parity (*primiparous* compared to *multiparous* women) showed no statistically association with EIBF practice (aOR=0.288, 95%CI: 0.034–2.430, $p=0.252$).

Table 5. Effect of EIBF on the onset of lactation

Variable	Onset of lactation		OR (95% CI)	p
	Earlier (<72 hours)	Delayed (≥ 72 hours)		
EIBF				
- yes	36 (90.0%)	7 (50.0%)	9 (2.07 – 39.19)	0.004
- no	4 (10.0%)	7 (50.0%)		
Total	40 (74.1%)	14 (25.9%)		

EIBF= early initiation of breastfeeding

Table 5 shows the association between EIBF and the onset of lactation. Mothers who successfully practiced EIBF demonstrated higher odds of earlier lactation onset (< 72 hours) compared to those who did not practice EIBF (unadjusted OR = 9.00; 95% CI: 2.07–39.19; $p = 0.004$).

Qualitative results

Fourteen mothers from the intervention and control groups were interviewed. They included mothers who did not practice EIBF or EBF and mothers with different levels of involvement in the empowerment program. Four themes were identified.

Theme 1. Delivery-related and health-system barriers to EIBF

Participants identified three barriers to EIBF: cesarean delivery, neonatal conditions that required immediate medical attention, and the absence of facilitation by hospital staff. After a cesarean birth,

mothers reported that staff did not help them start breastfeeding because the surgical wound was still being closed.

“I had a cesarean section, but the staff did not facilitate EIBF. They said they needed to close the surgical incision.” (Informant SS no 1)

Table 6. Informant characteristics

Informant	Age (years)	Parity	Group
1	31	Primiparous	Intervention
2	20	Primiparous	Intervention
3	30	Multiparous	Control
4	33	Multiparous	Intervention
5	28	Multiparous	Intervention
6	28	Primiparous	Control
7	30	Multiparous	Control
8	30	Multiparous	Control
9	35	Multiparous	Control
10	24	Multiparous	Intervention
11	34	Multiparous	Control
12	22	Primiparous	Intervention
13	27	Multiparous	Intervention
14	24	Primiparous	Control

Theme 2. Social and maternal barriers to EBF

Mothers described several obstacles to exclusive breastfeeding: pressure from family, a perception that their milk supply was insufficient, employment, nipple pain, worry about the infant's weight, and short birth intervals. Relatives urged some mothers to give formula when the baby cried a lot or seemed not to gain enough weight. Working mothers had little time to breastfeed and worried about their milk supply, and nipple pain added physical discomfort.

“...Since my baby was born, I have given formula milk. My parents were the ones who insisted; they said they felt sorry because my baby kept crying. My breast milk came out a lot on the 4th day. I couldn't refuse my parents, even though I had already told them.” (Informant no 5)

Theme 3. Strategies to maintaining breast milk supply

To keep their breastfeeding supply adequate, mothers ate and drank more, ate vegetables such as sweet leaf and Indian borage (*Coleus amboinicus*), and used products they believed promoted lactation (galactagogues or supplements). These strategies reflected culturally shaped beliefs about how to sustain milk production.

“...Eat a lot, Mom, so that the breast milk is enough. I also drink breast milk boosters. Once I take that tablet, my breasts immediately feel full. I don't take the supplement every day either; at most, I take the breast milk booster every other day. If I take it every day, I'm afraid my milk will be excessive and go to waste. Also, eat Indian borage leaf vegetables...” (Informant no 11)

Theme 4. Family support for breastfeeding

Mothers who breastfed exclusively said they were supported by their husbands, parents and in-laws. This support took the form of help with infant care, food and snacks, emotional encouragement, and practical help when the mother was tired or busy. These accounts suggest that husbands and extended family can play an important role in helping mothers continue breastfeeding.

“...When taking care of the baby, it's both my husband and me. Sometimes my in-laws help. My in-laws often send me food. They say it's to increase my breast milk. I'm also told to eat torbangun leaf vegetables by my in-laws. When I'm tired, my husband will help massage my back...”
(Informant CH no 14)

Integration of quantitative and qualitative findings showed in table 6

Table 7. Joint display of quantitative and qualitative findings

Quantitative finding	Qualitative theme	Meta-inference
No between-group difference in EIBF, EBF, knowledge, BSES	Themes 1–2: delivery-room, family and maternal barriers	Divergence explained: maternal-level empowerment is insufficient when facility routines and household advice determine outcomes
Cesarean aOR 0.047 for EIBF	Theme 1: initiation not facilitated during wound closure	Convergence: a modifiable facility-process barrier
EIBF associated with earlier lactation (OR 9.0)	Theme 3: active management of milk supply	Complementarity: early suckling may ease supply anxiety
EBF 70.4% in both groups	Themes 2 and 4: family pressure versus family support	Expansion: EBF depends on the balance of household pressure and support

DISCUSSION

Principal findings

In this convergent mixed-methods study in Pematangsiantar, a maternal empowerment package (antenatal counselling, pocketbook, video material and follow-up) did not produce a statistically detectable improvement in early initiation of breastfeeding (EIBF), exclusive breastfeeding (EBF), knowledge or breastfeeding self-efficacy compared with a pocketbook-only control. Three findings nevertheless carry practical weight. EIBF was strongly associated with earlier lactation onset. Cesarean delivery was the only factor independently associated with failure to initiate within the first hour. Mothers' accounts placed the main barriers in the delivery room, perceived milk insufficiency, and family advice, rather than maternal knowledge.

Group comparability and interpretation of the program effect

The two groups were broadly similar in age, parity, education, ethnicity, employment, delivery mode and infant characteristics, but gestational age at enrolment differed by 3.6 weeks (32.9 vs 36.6 weeks; $p < 0.001$). This is compatible with the sequential recruitment described in the methods: women who entered the program earlier in the third trimester had time to complete three counselling sessions

and a home visit before delivery. Because allocation was not randomized, unmeasured differences between recruitment periods, such as practice routines or staffing, cannot be excluded, and the comparison should be regarded as exploratory. The control group also had twice the proportion of cesarean births (22.2% vs 11.1%) yet a higher proportion of EIBF, a pattern that more plausibly reflects small numbers than a true effect.

Effect of the program on EIBF, EBF, knowledge and self-efficacy

The absence of a detectable effect contrasts with syntheses showing that educational interventions improve breastfeeding self-efficacy¹⁰ and that breastfeeding support increases breastfeeding duration and, in particular, exclusivity.⁵ An evidence review for the US Preventive Services Task Force similarly found that support interventions raised exclusive breastfeeding up to and at six months (risk ratio 1.46, 95% CI 1.20–1.78; 37 trials) but showed no relationship with breastfeeding initiation.¹¹ A meta-analysis of randomized trials in South Asia found that interventions improved early initiation overall, with health-system-strengthening interventions showing stronger effects than other types.¹² Four explanations for our null result, which are not mutually exclusive, seem more plausible than a true absence of benefit.

First, the study had limited precision. The sample size was calculated for an assumed 37-percentage-point difference. In a post hoc approximation, with 27 women per group and 80% power, a control-group EIBF proportion of 85.2% would leave no realistic room to detect an improvement, and for EBF (control 70.4%) only differences of roughly 26 to 37 percentage points would be detectable. The confidence intervals are therefore too wide to exclude either benefit or harm.

Second, baseline EIBF was already high. EIBF reached 79.6% overall, far above the global figure of 27% of newborns who received breast milk within the first hour, of whom only 14% had at least an hour of immediate skin-to-skin contact.² Participants were recruited at independent midwifery practices and 83.3% delivered vaginally, so the sample probably represents a less medicalized and more supportive stratum than the global average, and self-reported timing may be overstated. In an Ethiopian trial in which only 38.1% of controls initiated early, counselling raised EIBF to 54.1%¹³; counselling appears to add most where baseline practice is poor.

Third, the intervention was antenatal only and the comparator was active. There was no delivery-room or early postnatal component, and controls received the pocketbook, so the study tested the added value of counselling, video and follow-up rather than of education itself. Evidence favours multicomponent interventions with at least three sessions spanning the antenatal and postnatal periods¹⁴, and a 2025 meta-analysis of 26 trials found that postnatal interventions raised self-efficacy more than antenatal ones.¹⁵

Fourth, the maternal-level measures moved in the expected direction but not significantly. Post-intervention knowledge (8.07 vs 7.78) and BSES scores (58.48 vs 56.37) were numerically higher in the intervention group. Baseline knowledge differed (7.78 vs 8.30) and within-group there is no differences.

Mode of delivery and early initiation

Cesarean delivery was the only independent correlate of EIBF (aOR 0.047, 95% CI 0.006–0.377). The direction agrees with Indonesian survey data, in which cesarean birth was associated with higher odds of delayed initiation (aOR 2.78) and infants from Sumatera had about twice the odds compared with Java-Bali (aOR 2.02).⁴ It also agrees with a meta-analysis in which cesarean section was associated with 79% lower odds of timely initiation (OR 0.21; 29,919 participants)¹⁶, and with a scoping review of 55 articles in which most studies reported higher breastfeeding rates after vaginal birth than after cesarean birth, with the gap in exclusive breastfeeding narrowing by three and six months.¹⁷ The magnitude of our estimate is almost certainly inflated. Only nine mothers delivered by cesarean and only 11 did not initiate early, so the three-predictor model had fewer than four events per variable, a setting prone to sparse-data bias. The interval overlaps the pooled estimate of 0.21. We therefore treat the finding as directional rather than as an effect size to be quoted.

Mothers' accounts suggest a mechanism that lies in the organization of care rather than in the surgery itself: staff did not facilitate initiation while the wound was being closed (Theme 1). Early or immediate skin-to-skin contact after cesarean birth improved breastfeeding and exclusive breastfeeding rates during the hospital stay in a recent meta-analysis¹⁸, yet its implementation remains inconsistent because of various barriers.¹⁹ WHO recommends early, uninterrupted skin-to-skin contact and practical help to start breastfeeding soon after birth.² This finding also helps explain the null program effect. Antenatal counselling builds knowledge and intention, but the opportunity to initiate breastfeeding arises during childbirth, when clinical conditions, procedures, neonatal needs and staff practices decide whether it happens. A mother may have adequate knowledge and confidence and still be unable to initiate if the maternity-care system does not facilitate it, which is consistent with the stronger effects reported for health-system-strengthening interventions.¹²

Early initiation and lactation onset

Mothers who initiated breastfeeding early had nine times higher odds of lactation onset < 72 hours (OR 9.0, 95% CI 2.07–39.19). Delayed onset occurred in 25.9% of our sample, close to the pooled incidence of 30% in a recent meta-analysis, which also noted that the contribution of the timing of the first breastfeeding session, and hence of mother–infant separation, remains undetermined.²⁰ Early suckling is a plausible physiological driver, and delayed onset has been linked to a higher risk of stopping any or exclusive breastfeeding by four weeks.²⁰ A scoping review of 46 studies grouped 34 influencing factors into five themes, including breastfeeding behaviors and interventions by medical staff.²¹ Early initiation may also matter further downstream: among 4,003 Indonesian working mothers, EIBF was associated with about twice the odds of EBF.²² Our estimate is unadjusted and the interval is wide. Residual confounding by delivery mode, mother–infant separation and neonatal condition is likely, and the method of ascertaining lactation onset should be reported. The finding supports early skin-to-skin contact and suckling support but does not show that EIBF alone shortens the time to lactation.

Breastfeeding self-efficacy and exclusive breastfeeding

Breastfeeding self-efficacy refers to a mother's belief in her ability to breastfeed her infant. It comes from Bandura's social cognitive theory, in which self-efficacy is built from four sources: performance accomplishments, vicarious experience, verbal persuasion and physiological states.⁹ In this study, self-efficacy was measured once with the 12-item Breastfeeding Self-Efficacy Scale–Short Form (BSES-SF) together with exclusive breastfeeding (EBF). We found no difference a BSES score between the two groups. This result differs from syntheses showing that educational interventions improve breastfeeding self-efficacy.⁸ Three features of our design may explain the difference. First, the comparator was active; control mothers also received the pocketbook, so we tested the added value of counselling, video and follow-up, not of education itself. Second, the intervention was delivered mainly in the antenatal period. In Bandura's model, performance accomplishments are the most dependable source of self-efficacy, and for breastfeeding these are real experiences such as latching, comfort and milk flow, which only occur after birth. A meta-analysis found that postnatal interventions raised self-efficacy more than antenatal ones,¹³ and effective programs usually combine at least three sessions across the antenatal and postnatal periods.¹² Third, because BSES-SF was measured only once, we could not assess change in self-efficacy over time, and the groups differed in gestational age at enrolment (32.9 vs 36.6 weeks), which may have affected exposure to the program.

The identical EBF rates, despite slightly higher BSES in the intervention group, suggest that maternal confidence alone did not determine exclusivity. The interviews help explain this. Mothers who breastfed exclusively described husbands, parents and in-laws who shared infant care, provided food and offered encouragement (Theme 4). This is consistent with Bandura's verbal persuasion source and with findings from independent midwifery practices in Bengkulu, where husbands' support was the most dominant factor in breastfeeding self-efficacy.²³ In contrast, mothers who gave formula described pressure from relatives when the infant cried, perceived insufficient milk, nipple pain and employment demands (Theme 2). One mother had told her parents of her intention to breastfeed but "couldn't refuse" their insistence on formula, even though her milk had come in on day four. Perceived milk insufficiency is itself a self-efficacy problem, because it reflects doubt in one's ability to produce enough milk, and nipple pain is a negative physiological cue in Bandura's terms. This would also explain why mothers used dietary measures and boosters to manage supply (Theme 3). A mother may therefore report good confidence and still not breastfeed exclusively if household decision-makers do not support the choice. A meta-analysis of paternal-support interventions found improved breastfeeding success (RR 1.41) but no significant gain in self-efficacy.⁵ Our package was directed at mothers only, and we did not record whether husbands or grandmothers attended. Because BSES-SF was measured once and not compared between mothers who did and did not breastfeed exclusively, we cannot say whether higher self-efficacy was associated with EBF in this sample, and the study was not powered for BSES. The result should be read as a lack of demonstrated effect, not as evidence that the program had no effect. Future studies

should measure BSES-SF in both the antenatal and postnatal periods, include postnatal sessions, involve husbands and grandmothers, and test whether self-efficacy predicts EBF alongside family support.

Barriers to exclusive breastfeeding in the family and social context

EBF was reported by 70.4% of participants in both groups, and the between-group comparison showed no statistically significant difference. This result indicates that the study did not demonstrate an additional benefit of the intervention package over the pocketbook-based control condition. It does not establish equivalence between the two approaches, nor does it demonstrate that the intervention had no possible effect under other circumstances. The interviews explain why knowledge or confidence may not translate into exclusive breastfeeding. Mothers described pressure from relatives to give formula when infants cried, perceived insufficient milk, nipple pain, concern about infant weight, and employment demands (Theme 2). This echoes Indonesian findings that perceived milk insufficiency and the influence of families, communities, health practitioners and employment shaped formula use.²⁴ Among Batak Toba mothers in North Sumatra, exclusive breastfeeding was a negotiated household practice, and formula-induced infant quietness retrospectively validated family beliefs that breast milk had been insufficient.²⁵ Because 63% of our participants were Batak, this reading is directly relevant, and the mother who could not refuse her parents although her milk had come in on day four illustrates it. Early supplementation is common nationally, with about one in five newborns receiving foods or liquids other than breast milk within three days of birth.²⁶ Employment was a further constraint; although only 9.3% of our sample worked, working mothers are a recognized vulnerable group for EBF in Indonesia.²²

Family was a double-edged resource. Mothers who breastfed exclusively described husbands, parents and in-laws sharing infant care, providing food and offering encouragement (Theme 4), whereas other relatives urged formula (Theme 2). In independent midwifery practices in Bengkulu, husbands' support was the most dominant factor in breastfeeding self-efficacy.²³ A meta-analysis of paternal-support interventions reported 17% higher early initiation (RR 1.17) and 41% higher overall breastfeeding success (RR 1.41), although the gain in self-efficacy was not statistically significant.⁶ Our package was directed at mothers, and whether husbands or grandmothers attended sessions is not recorded. Counselling that includes household decision-makers may therefore work better than counselling mothers alone, but this was not tested here.

Supply-enhancing practices (Theme 3) reflect the same concern about milk sufficiency. They included eating sweet leaf (*katuk*, *Sauropus androgynus*) and Indian borage (*torbangun*, *Coleus amboinicus*) and taking commercial boosters; dietary strategies have likewise been reported to support breastfeeding continuation in Central Java.²⁴ These practices are descriptions of maternal beliefs, not evidence of effectiveness, and they should be met with respect and safety information. LactMed reports that *S. androgynus* leaves are used as a galactagogue in Indonesia and Malaysia and that excessive ingestion of fresh leaves can cause bronchiolitis obliterans²⁷, and that data on the safety and efficacy of

Coleus in nursing mothers are lacking despite long traditional use²⁸. A mother who takes a booster only on alternate days for fear of “excess” milk suggests that dosing decisions are made informally.

Integration of quantitative and qualitative findings

The mixed-methods approach provides a broader interpretation than either component alone. Quantitatively, the study did not identify statistically significant differences between the groups in EIBF, EBF, knowledge, or self-efficacy. Qualitatively, mothers described circumstances that could constrain the translation of knowledge and intentions into practice, including limited facilitation after caesarean delivery, conflicting family advice, pain, concerns about milk supply, and employment responsibilities. These themes offer plausible context for the quantitative pattern, but they do not prove why the intervention did not produce a statistically significant difference.

The two strands also point to different levels at which breastfeeding support may be required. Maternal counselling addresses knowledge and confidence; delivery-room protocols address timely initiation; family-inclusive education addresses household advice and practical support; and postpartum services address pain, feeding difficulties, and concerns about infant growth. These components are complementary rather than interchangeable. The present study did not isolate the effects of these individual components, so it cannot establish which combination would be most effective.

The joint display (Table 7) shows four patterns. The null program effect diverges from the premise that empowered mothers will breastfeed early and exclusively, and the interviews explain the divergence: facility routines and household advice shape outcomes beyond maternal knowledge. The association between cesarean delivery and EIBF converges with Theme 1, pointing to a modifiable facility-process barrier. The association between EIBF and earlier lactation is complemented by Theme 3, which shows mothers actively managing milk supply; early suckling may ease supply anxiety, but this is a hypothesis for future testing. Finally, the identical EBF proportions in both groups are expanded by Themes 2 and 4, which suggest that EBF depends on the balance between household pressure and household support.

Strengths and limitations

Strengths include the integration of outcome data with mothers’ accounts, a locally grounded setting (Sumatra, Batak families, independent midwifery practices), an a priori sample-size calculation, a knowledge instrument with acceptable reliability ($\alpha = 0.785$), and credibility procedures in the qualitative arm (two independent coders, an audit trail and member checking). Several limitations should be noted. Allocation was sequential and not randomized, and the groups differed in gestational age at enrolment. The sample was small, giving imprecise estimates and low power, and the regression models were affected by sparse data. Outcomes were self-reported, and the timing of EBF assessment needs clarification. Several outcomes were tested without adjustment for multiplicity. Mode of delivery could not be controlled and may have strongly influenced EIBF, and the association between EIBF and lactation onset is unadjusted. Family support was explored qualitatively and not measured with a validated scale, so its independent contribution could not be estimated. The qualitative sample was

small, drawn from one city, and interviews were translated for reporting, so the findings should not be generalized to all Batak communities or other settings. Further research should evaluate breastfeeding support as a combination of maternal counseling, appropriate maternity-care practices, management of breastfeeding difficulties, and family-inclusive education. Larger studies with prespecified outcomes, clearly defined follow-up periods, and statistically stable models are needed to determine whether these approaches improve exclusive breastfeeding rates.

CONCLUSIONS AND RECOMMENDATIONS

The intervention was not associated with a statistically significant between-group difference in exclusive breastfeeding in this sample. EIBF strongly associated with earlier onset of lactation. Breastfeeding promotion therefore requires integration of maternal empowerment with supportive maternity-care practices, family engagement, and broader health-system and social support. The findings suggest that breastfeeding promotion should move beyond mother-focused education toward a multilevel approach. Antenatal empowerment should be complemented by active involvement of husbands and extended family members to address misconceptions about breast milk adequacy and formula feeding. Maternity facilities should strengthen implementation of EIBF protocols, including support for eligible mothers undergoing cesarean delivery and mother–infant skin-to-skin contact when clinically feasible. Health workers should provide early management of breastfeeding difficulties, while workplace and family support should be strengthened for mothers who need to maintain exclusive breastfeeding after returning to work. The strong association between EIBF and earlier onset of lactation further emphasizes the importance of ensuring that mothers have the opportunity to initiate breastfeeding promptly after birth.

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