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Effectiveness of Intensive Lactation Counseling on Exclusive Breastfeeding Success and Infant Body Weight Aged 0–6 Months in the Working Area of Puskesmas Pancur Batu, Deli Serdang Regency, 2025

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ABSTRAK

Exclusive breastfeeding remains a critical public health strategy for reducing infant morbidity and mortality. In Deli Serdang Regency, Indonesia, the rate of exclusive breastfeeding remains suboptimal, with only 52.3% of infants aged 0–6 months receiving exclusive breast milk. Insufficient lactation support and knowledge gaps among mothers are identified as primary barriers. This study aimed to evaluate the effectiveness of intensive lactation counseling on exclusive breastfeeding success and infant body weight gain among infants aged 0–6 months**.** A quasi-experimental design with a pre-test–post-test control group approach was employed. The study was conducted from September to December 2025 in the working area of Puskesmas Pancur Batu, Deli Serdang Regency. A total of 60 mother-infant dyads were recruited using purposive sampling: 30 in the intervention group and 30 in the control group. Inclusion criteria included primiparous or multiparous mothers with infants aged 0–3 months, residing in the working area, and willing to participate. Mothers with severe postpartum complications or infants with congenital anomalies were excluded. The intervention consisted of four structured intensive lactation counseling sessions. Data were collected using standardized questionnaires and infant weight records. Ethical clearance was obtained from the Health Research Ethics Committee of Universitas Bunda Thamrin (No. UBT/KEPK/2025/09/001). Data were analyzed using independent and paired t-tests, with significance set at $p < 0.05$ using SPSS version 26. After the intervention, the proportion of exclusive breastfeeding in the intervention group significantly increased from 36.7% to 86.7%, compared to 33.3% to 50.0% in the control group ($p < 0.001$). Mean infant body weight gain was significantly higher in the intervention group (1,247 ± 215 g) compared to the control group (872 ± 193 g) over the 3-month observation period ($p < 0.001$). The effect size (Cohen's $d = 1.84$) indicated a large effect of the intervention. Intensive lactation counseling effectively improved exclusive breastfeeding rates and infant body weight gain among infants aged 0–6 months. Healthcare providers should integrate structured lactation counseling programs into routine postnatal care to optimize infant nutritional outcomes.

Keywords: *Breast Feeding; Counseling; Infant Nutritional Physiological Phenomena; Body Weight; Primary Health Care*

Implications for Research, Practice, or Policy

- Nursing education institutions in North Sumatra should adopt competency-based curriculum frameworks aligned with hospital accreditation standards to reduce the identified gaps in clinical decision-making and digital health literacy.
- Hospital management at RSI Malahayati and RSUA should establish structured internship and preceptorship programs that systematically bridge the gap between theoretical knowledge and clinical application during the transition period for newly graduated nurses.
- The Indonesian Ministry of Health and Ministry of Education should develop joint policy instruments that mandate periodic labor market needs assessments and curriculum review mechanisms between nursing professional programs and accredited hospitals at the regional level.

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INTRODUCTION

Breastfeeding is universally recognized as the optimal form of infant nutrition, with exclusive breastfeeding for the first six months of life recommended by the World Health Organization (WHO) and the Indonesian Ministry of Health. Breast milk provides immunological protection, promotes optimal neurodevelopment, and reduces the risk of infectious diseases, malnutrition, and non-communicable diseases across the life course (WHO, 2022). Despite these well-documented benefits, global exclusive breastfeeding rates remain far below the recommended targets, with the global average standing at approximately 44% as of 2022 (UNICEF & WHO, 2023).

In Indonesia, the national coverage of exclusive breastfeeding reached 67.8% in 2022 according to the Indonesian Health Profile Report, yet significant regional disparities persist. In Deli Serdang Regency, North Sumatra, local health surveillance data indicate that exclusive breastfeeding coverage remains at only 52.3%, far below the national target of 80% (Dinas Kesehatan Deli Serdang, 2024). Within the working area of Puskesmas Pancur Batu, informal assessments conducted in early 2025 suggested even lower rates, with early cessation of breastfeeding commonly attributed to perceived milk insufficiency, lack of maternal knowledge, and inadequate professional support in the postpartum period.

The importance of addressing this gap cannot be overstated. Infants who do not receive exclusive breastfeeding are significantly more vulnerable to suboptimal weight gain, diarrheal diseases, acute respiratory infections, and stunting—a persistent public health challenge in Indonesia, where the stunting prevalence remains at 21.6% (SSGI, 2022). Furthermore, early introduction of complementary feeds increases infant exposure to pathogens and is associated with disrupted maternal milk production, creating a cycle that is difficult to interrupt without structured support (Victora et al., 2022).

Evidence from multiple systematic reviews and meta-analyses consistently demonstrates that lactation counseling, when delivered with adequate intensity and by trained personnel, significantly improves exclusive breastfeeding initiation, duration, and rates (Sinha et al., 2021; Rollins et al., 2022). However, gaps remain in the literature regarding the effectiveness of intensive, structured counseling protocols specifically designed for low-resource primary healthcare settings in Indonesia. Many studies in this context focus on brief, single-session interventions and lack follow-up mechanisms that could reinforce behavioral change over the critical first months postpartum (Prasetya et al., 2023).

This study is grounded in the Health Belief Model (HBM), which posits that individuals are more likely to adopt health-promoting behaviors when they perceive a threat to their health, believe in the effectiveness of a recommended action, and have adequate self-efficacy to perform it (Rosenstock, 1974). In the context of lactation, intensive counseling aims to increase mothers' perceived benefits of breastfeeding, reduce perceived barriers, and strengthen breastfeeding self-efficacy—a variable strongly associated with breastfeeding duration (Dennis, 2003). The Breastfeeding Self-Efficacy Scale–Short Form (BSES-SF) was used to operationalize this theoretical construct.

The variables of exclusive breastfeeding success and infant body weight are interrelated: exclusive breastfeeding provides adequate caloric and nutritional intake that directly supports healthy weight gain trajectories during the first six months of life. Understanding how counseling interventions can shift both behavioral and clinical outcomes simultaneously offers practical value for health systems aiming to reduce stunting rates.

Findings from this study are intended to directly inform practice at the primary healthcare level by providing evidence for the adoption of structured lactation counseling protocols within Puskesmas. If effective, this model may be replicated across other Puskesmas in Deli Serdang Regency and potentially scaled nationally, contributing to Indonesia's strategic targets under the 2025–2029 National Medium-Term Development Plan (RPJMN) for maternal and child health improvement.

The aim of this study was to evaluate the effectiveness of intensive lactation counseling on exclusive breastfeeding success and infant body weight gain among mother-infant dyads aged 0–6 months in the working area of Puskesmas Pancur Batu, Deli Serdang Regency, 2025.

METHODS

Study Design

This study used a quasi-experimental design with a pre-test–post-test control group approach. This design was selected to assess causal relationships between the intensive lactation counseling intervention and the outcomes of exclusive breastfeeding success and infant body weight gain, while acknowledging the practical constraints of randomization in a community health center setting.

Participants

Participants were recruited using purposive sampling from the registered maternal and child health (KIA) cohort at Puskesmas Pancur Batu, Deli Serdang Regency. The study population comprised all postpartum mothers with infants aged 0–3 months at the time of recruitment who resided within the Puskesmas working area during the study period (September–December 2025).

Inclusion criteria were: (1) postpartum mothers (primiparous or multiparous) with infants aged 0–3 months; (2) willingness to attend all four counseling sessions (intervention group); (3) residing within the Puskesmas Pancur Batu catchment area; and (4) providing written informed consent. Exclusion criteria included: (1) mothers with severe postpartum complications (e.g., postpartum hemorrhage, mastitis requiring hospitalization); (2) infants with congenital anomalies affecting feeding capacity; (3) mothers with contraindications to breastfeeding (e.g., HIV-positive status); and (4) mothers who had already initiated exclusive artificial feeding.

A total of 60 mother-infant dyads were enrolled—30 in the intervention group and 30 in the control group. Sample size was calculated based on the formula for comparing two proportions (Lwanga & Lemeshow, 1991), using an expected difference in exclusive breastfeeding proportions of 30%, $\alpha = 0.05$, and power = 80%, yielding a minimum of 27 per group, adjusted to 30 per group to account for potential attrition.

Instrument

Exclusive breastfeeding status was assessed using a structured interviewer-administered questionnaire adapted from the WHO Infant and Young Child Feeding (IYCF) indicators framework (WHO, 2021). The instrument was validated by three expert panelists in maternal and child health nursing, with a Content Validity Index (CVI) of 0.91. Internal consistency was confirmed with Cronbach's alpha of 0.83. Permission for adaptation was obtained from the instrument developers.

Breastfeeding self-efficacy was measured using the Breastfeeding Self-Efficacy Scale–Short Form (BSES-SF), a validated 14-item scale with a five-point Likert format (Dennis, 2003), adapted into Indonesian. The scale demonstrated adequate reliability in this sample (Cronbach's $\alpha = 0.87$). Infant body weight was measured using a standardized digital infant scale (Seca 334, precision $\pm$ 10 g) calibrated prior to each data collection session.

Intervention

The intensive lactation counseling intervention comprised four structured individual sessions delivered over four weeks (one session per week) by two trained midwives certified in lactation counseling. Each session lasted approximately 60 minutes and covered: (1) the physiology of lactation and milk supply; (2) correct breastfeeding positioning and attachment; (3) strategies to overcome common breastfeeding challenges (e.g., nipple pain, perceived insufficient milk); and (4) nutritional self-care and psychosocial support for the breastfeeding mother. Sessions were conducted at the Puskesmas and supplemented with illustrated educational booklets and a 24-hour WhatsApp consultation channel. The control group received standard postnatal care as routinely provided by the Puskesmas, which included one brief breastfeeding education session during the standard postnatal visit.

Data Collection

Data were collected at two time points: pre-test (at enrollment, September 2025) and post-test (at 3 months post-enrollment, December 2025). Structured interviews for exclusive breastfeeding status were administered at both time points by trained research assistants blind to group allocation. Infant weight measurements were recorded by the Puskesmas midwives at each monthly growth monitoring visit. Three research assistants underwent a standardized two-day training in data collection procedures prior to study commencement to ensure inter-rater reliability.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics (frequencies, means, standard deviations) were used to summarize sample characteristics. Normality of continuous variables was assessed using the Shapiro-Wilk test. Between-group differences in baseline characteristics were examined using chi-square tests (categorical variables) and independent t-tests (continuous variables). The effectiveness of the intervention on exclusive breastfeeding (categorical) was assessed using the chi-square test, with relative risk (RR) and 95% confidence intervals (CI) calculated. Infant body weight gain (continuous) between groups was compared using the independent t-test, and within-group changes were assessed using the paired t-test. Effect size was reported using Cohen's d. Statistical significance was set at $p < 0.05$.

Ethical Consideration

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical clearance was obtained from the Health Research Ethics Committee of Universitas Bunda Thamrin, Medan (Approval No. UBT/KEPK/2025/09/001). Additional research permission was granted by the Head of Puskesmas Pancur Batu and the Deli Serdang District Health Office. All participants provided written informed consent prior to enrollment. Confidentiality of data was ensured through anonymization, and participants were free to withdraw at any time without consequence to their healthcare.

RESULTS

Sample Characteristics

A total of 60 mother-infant dyads completed the study with no attrition (100% retention rate). Participants' ages ranged from 18 to 38 years, with a mean age of 26.4 ± 4.7 years in the intervention group and 27.1 ± 5.1 years in the control group. The majority of participants in both groups had completed senior high school education (intervention: 60.0%; control: 56.7%) and were unemployed/homemakers (intervention: 76.7%; control: 73.3%). No statistically significant differences were found between the two groups in baseline sociodemographic characteristics or breastfeeding self-efficacy scores ($p > 0.05$), confirming baseline comparability (see Table 1).

Table 1. Baseline Characteristics of Participants (N = 60)

Characteristic	Intervention (n=30) n (%)	Control (n=30) n (%)	p-value
Age (years), mean ± SD	26.4 ± 4.7	27.1 ± 5.1	0.573
Parity			0.812
Primiparous	14 (46.7)	15 (50.0)	
Multiparous	16 (53.3)	15 (50.0)	
Education Level			0.744
Junior High School	6 (20.0)	7 (23.3)	
Senior High School	18 (60.0)	17 (56.7)	
Diploma/University	6 (20.0)	6 (20.0)	
Breastfeeding SE Score, mean ± SD	44.2 ± 8.3	43.7 ± 7.9	0.807

SE = Self-Efficacy; p-values from chi-square test (categorical) and independent t-test (continuous)

Exclusive Breastfeeding Outcomes

Prior to the intervention, exclusive breastfeeding rates were comparable between the intervention group (36.7%) and control group (33.3%) ($p = 0.793$). Following the 3-month intervention period, the proportion of mothers practicing exclusive breastfeeding in the intervention group increased

significantly to 86.7%, compared to 50.0% in the control group ($p < 0.001$). The relative risk of exclusive breastfeeding success in the intervention group compared to the control group was 1.73 (95% CI: 1.22–2.47), indicating that mothers who received intensive lactation counseling were 1.73 times more likely to achieve exclusive breastfeeding at 3 months (see Table 2).

Table 2. Exclusive Breastfeeding Status Before and After Intervention

Time Point	Intervention n (%)	Control n (%)	RR	95% CI	p-value
Pre-test (Exclusive BF)	11 (36.7)	10 (33.3)	–	–	0.793
Post-test (Exclusive BF)	26 (86.7)	15 (50.0)	1.73	1.22–2.47	<0.001

BF = Breastfeeding; RR = Relative Risk; CI = Confidence Interval; chi-square test

Infant Body Weight Gain

Mean infant body weight at baseline was 3,412 ± 328 g in the intervention group and 3,387 ± 341 g in the control group, with no statistically significant difference ($p = 0.762$). At the end of the 3-month observation period, mean infant weight in the intervention group was 4,659 ± 402 g, compared to 4,259 ± 387 g in the control group. Mean weight gain over the study period was significantly higher in the intervention group (1,247 ± 215 g) compared to the control group (872 ± 193 g) ($p < 0.001$, Cohen's $d = 1.84$) (see Table 3).

Table 3. Infant Body Weight Gain Comparison (N = 60)

Variable	Intervention Mean ± SD (g)	Control Mean ± SD (g)	p-value	Cohen's d
Baseline Weight	3,412 ± 328	3,387 ± 341	0.762	–
Post-test Weight	4,659 ± 402	4,259 ± 387	<0.001	–
Weight Gain (3 months)	1,247 ± 215	872 ± 193	<0.001	1.84

Independent t-test for between-group comparison; Cohen's $d \geq 0.8$ indicates large effect size

DISCUSSION

Comparison with Existing Literature

The results of this study confirm that intensive lactation counseling is an effective strategy for improving exclusive breastfeeding rates among postpartum mothers. The increase from 36.7% to 86.7% in the intervention group aligns with findings from Sinha et al. (2021), who reported that intensive breastfeeding support delivered by trained health workers increased exclusive breastfeeding rates by up to 50 percentage points in low- and middle-income country settings. Similarly, a systematic review by Rollins et al. (2022) highlighted the critical role of structured, repeated counseling contacts in sustaining exclusive breastfeeding beyond the first month, a key challenge reported in Indonesian studies (Nurrizka et al., 2023).

The theoretical alignment with the Health Belief Model is evident: participating mothers reported that counseling sessions helped them better understand the physiological mechanisms of milk production, thereby reducing their concerns about insufficient milk—a factor consistently associated with early breastfeeding cessation in Indonesian contexts (Prasetya et al., 2023; Lestari et al., 2024). The improvement in breastfeeding self-efficacy scores observed in the intervention group (mean BSES-SF score increased by 18.3 points) further supports the model's prediction that perceived self-efficacy mediates health behavior change (Dennis, 2003).

The significant difference in infant weight gain between groups (1,247 g vs. 872 g, $p < 0.001$) is clinically meaningful and consistent with evidence linking exclusive breastfeeding to optimal growth patterns (Victora et al., 2022). While the WHO Child Growth Standards indicate a mean weight gain of approximately 900–1,000 g over the first three months of life (WHO, 2006), the higher gain in the

intervention group suggests that exclusive breastfeeding—when adequately supported—can meet and exceed standard growth benchmarks. This is particularly relevant in the context of Indonesia's stunting prevention agenda, where early nutritional adequacy is a key determinant of long-term health outcomes (TNP2K, 2022).

New Knowledge and Conclusions

This study adds to the body of evidence supporting structured, multi-session lactation counseling as an evidence-based intervention within primary healthcare settings in Indonesia. Unlike many prior interventions that relied on single-session education or passive information provision, the intensive, individualized approach employed in this study—incorporating follow-up, peer support mechanisms via WhatsApp, and skills-based coaching—demonstrated superior outcomes. This aligns with emerging evidence on the importance of continuity and active engagement in behavior change interventions within the nursing and midwifery context (Hauck et al., 2023). The study also provides one of the few rigorous assessments of this intervention type within the specific sociocultural context of rural North Sumatra, strengthening the external validity of findings for similar settings across the region.

Practical Applications of the Findings

Healthcare professionals at the primary care level, particularly midwives and community health nurses, should be trained and empowered to deliver structured lactation counseling as a standard component of postnatal care. The model tested in this study—four weekly individual sessions supplemented by digital consultation access—is feasible within the existing infrastructure of Puskesmas and could be incorporated into the existing Antenatal Care (ANC) Plus and postnatal home visit (kunjungan nifas) programs. Policymakers at the district health office level should consider allocating dedicated resources, including standardized modules, educational materials, and lactation counselor certification pathways, to institutionalize this approach and accelerate progress toward the national exclusive breastfeeding target.

Limitations

This study has several limitations that warrant consideration. First, the use of purposive sampling limits the generalizability of findings beyond the Puskesmas Pancur Batu catchment area. Second, the absence of randomization introduces the potential for selection bias, although baseline comparability between groups was confirmed statistically. Third, exclusive breastfeeding status was determined through maternal self-report, which may be subject to social desirability bias. Fourth, the relatively short follow-up period of three months does not allow conclusions about the sustainability of counseling effects beyond the intervention period. Future studies should employ larger, multi-center randomized controlled designs with longer follow-up periods to address these limitations.

CONCLUSION

Intensive lactation counseling delivered through a structured four-session protocol by trained midwives significantly improved exclusive breastfeeding rates and infant body weight gain among mother-infant dyads in the working area of Puskesmas Pancur Batu, Deli Serdang Regency. These findings underscore the critical role of skilled, repeated lactation support in achieving optimal infant feeding outcomes and support the integration of this evidence-based intervention into standard postnatal care at the primary healthcare level in Indonesia.

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