

Exclusive Breastfeeding Education as an Effort to Optimize Infant Growth Aged 0–6 Months in Early Stunting Prevention at Kampung Bugis Primary Health Center in 2026

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Abstrak: Latar Belakang: Stunting masih menjadi masalah gizi utama di Indonesia. Pemberian ASI eksklusif (EBF) selama enam bulan pertama kehidupan merupakan intervensi kunci dalam pencegahan stunting. Puskesmas Kampung Bugis, yang membawahi empat wilayah kelurahan, memiliki cakupan ASI eksklusif yang belum optimal, sehingga diperlukan edukasi terstruktur bagi ibu hamil. Tujuan: Menganalisis pengaruh edukasi ASI eksklusif terhadap pengetahuan, praktik pemberian ASI, dan pertumbuhan bayi usia 0–6 bulan sebagai strategi pencegahan dini stunting. Metode: Penelitian pra-eksperimental dengan desain *one-group pretest-posttest*. Populasi penelitian terdiri dari 100 ibu hamil trimester ketiga di wilayah kerja Puskesmas Kampung Bugis. Sampel sebanyak 80 peserta diambil menggunakan teknik *proportional stratified random sampling* berdasarkan empat wilayah kelurahan. Intervensi berupa edukasi terstruktur yang menggunakan modul, leaflet, dan demonstrasi. Data pengetahuan diukur menggunakan kuesioner sebelum dan sesudah edukasi. Praktik ASI eksklusif dan pertumbuhan bayi (berat badan, panjang badan) dipantau hingga usia enam bulan. Analisis data menggunakan uji-t berpasangan (*paired t-test*) dan statistik deskriptif. Hasil: Rata-rata skor pengetahuan meningkat dari 57,1 (SD 10,4) menjadi 81,5 (SD 7,8) setelah edukasi ($p < 0,001$). Praktik ASI eksklusif mencapai 72,5% (58 dari 80 bayi). Rata-rata berat badan lahir sebesar 2.977 gram meningkat menjadi 7.066 gram pada usia enam bulan; rata-rata panjang badan adalah 65,6 cm. Prevalensi stunting (panjang badan menurut umur < -2 SD) pada usia enam bulan adalah 13,8% (11 bayi). Kesimpulan: Edukasi ASI eksklusif secara signifikan meningkatkan pengetahuan ibu dan mendorong praktik ASI eksklusif. Bayi yang mendapatkan ASI eksklusif menunjukkan pertumbuhan yang lebih baik dan tingkat stunting yang lebih rendah dibandingkan dengan bayi yang tidak mendapatkan ASI eksklusif.

Kata kunci: Pendidikan, ASI Eksklusif, Pertumbuhan Bayi, Stunting, Puskesmas

Abstract: Background: Stunting remains a major nutritional problem in Indonesia. Exclusive breastfeeding (EBF) during the first six months of life is a key intervention in preventing stunting. Kampung Bugis Primary Health Center, with four assisted sub-districts, has suboptimal EBF coverage, necessitating structured education for pregnant women. Objective: To analyze the effect of exclusive breastfeeding education on knowledge, breastfeeding practices, and infant growth aged 0–6 months as an early stunting prevention strategy. Method: A pre-experimental study with a one-group pretest-posttest design. The population consisted of 100 third-trimester pregnant women in the working area of Kampung Bugis Primary Health Center. A sample of 80 participants was taken using proportional stratified random sampling based on four sub-districts. The intervention was structured education using modules, leaflets, and demonstrations. Knowledge data were measured using a questionnaire before and after education. EBF practices and infant growth (weight, length) were monitored until six months of age. Data analysis used paired t-tests and descriptive statistics. Results: The mean knowledge score increased from 57.1 (SD 10.4) to 81.5 (SD 7.8) after education ($p < 0.001$). EBF practice reached 72.5% (58 of 80 infants). Mean birth weight of 2,977 grams increased to 7,066 grams at six months; mean length was 65.6 cm. Stunting prevalence (length-for-age < -2 SD) at six months was 13.8% (11 infants). Conclusion: Exclusive breastfeeding education significantly improved maternal knowledge and encouraged EBF practices. Infants receiving EBF showed better growth and lower stunting rates compared to those not receiving EBF.

Keywords: Education, Exclusive Breastfeeding, Infant Growth, Stunting, Primary Health Center

INTRODUCTION

Stunting is a linear growth disorder caused by chronic malnutrition and recurrent infections, particularly during the first 1000 Days of Life (HPK) [1]. Globally, 149.2 million toddlers experience stunting, and Indonesia ranks fourth worldwide with a prevalence of 21.6% (SSGI, 2022) [2]. Tanjungpinang City, especially the working area of Kampung Bugis Primary Health Center, recorded EBF coverage of 61.3% (2023), below the national target of 80% [3]. This low coverage correlates with stunting risk, as EBF provides optimal nutrition, immune factors, and hormonal stimulation that cannot be replaced by formula milk.

Previous research indicates that lack of maternal knowledge and skills are the main determinants of EBF failure. Structured education, provided from pregnancy and accompanied by demonstrations, has proven effective in increasing the duration and exclusivity of breastfeeding [4]. However, at Kampung Bugis Primary Health Center, EBF education programs are generally limited to individual consultations during pregnancy check-ups. There has been no group intervention with continuous monitoring until the postpartum period.

Beyond individual feeding practices, stunting is recognized as a multifactorial condition rooted in the interaction of maternal nutrition, infection exposure, water and sanitation conditions, and household food security during the first 1000 Days of Life (HPK), spanning conception to the child's second birthday [1]. Global evidence consistently positions exclusive breastfeeding as one of the most cost-effective interventions within this critical window, given its capacity to simultaneously address nutritional adequacy and immunological protection without requiring costly infrastructure [1], [7]. Nevertheless, national reports indicate that translating this evidence into sustained practice at the community level remains challenging, particularly in urban coastal areas where maternal employment, extended family influence, and inconsistent counseling contribute to early cessation of exclusive breastfeeding [15].

At the health system level, WHO's Baby-Friendly Hospital Initiative and Indonesia's national stunting reduction strategy emphasize continuity of lactation support from the antenatal period through the first six months postpartum, rather than a single point-of-contact consultation [6], [7]. Puskesmas-based antenatal classes, when combined with skill-based demonstration and post-discharge follow-up, are theorized to strengthen maternal self-efficacy, a key psychological determinant of breastfeeding persistence. This theoretical basis underlies the design of the structured, multi-session educational intervention evaluated in the present study, which was intended not only to transfer knowledge but to build practical competence and sustained support throughout the perinatal period.

This study aims to fill this gap by examining the effect of EBF education on knowledge, breastfeeding practices, and growth parameters of infants aged 0–6 months. The novelty of this study lies in measuring the impact of education on biological outcomes (anthropometry and stunting status) at the community level, not merely changes in knowledge. The hypotheses proposed are: (1) there is an increase in knowledge scores after education; (2) the proportion of EBF in the intervention group is higher than the baseline regional coverage; and (3) the stunting rate among exclusively breastfed infants is lower than the local stunting prevalence.

METHOD

Study Design, Time, and Place

This pre-experimental study employed a one-group pretest-posttest design. It was conducted in July 2026 at Kampung Bugis Primary Health Center, Tanjungpinang Kota

District, Riau Islands Province, covering four sub-districts: Kampung Bugis, Penyengat, Senggarang, and Tanjungpinang Kota.

Population and Sample

The target population comprised 100 third-trimester pregnant women registered in the Maternal and Child Health cohort. Inclusion criteria were gestational age ≥ 28 weeks, residency in the health center's working area, and consent for six-month follow-up. Exclusion criteria were severe pregnancy complications or congenital infant abnormalities.

Sample size was calculated using Slovin's formula (5% error margin):

$$n = 100 / (1 + 100 \times 0.05^2) = 80.$$

Proportional stratified random sampling was applied across the four sub-districts (Table 1).

Table 1. Distribution of population and sample by sub-district

Sub-district	Population	Proportion (%)	Sample
Kampung Bugis	25	25.0	20
Penyengat	20	20.0	16
Senggarang	30	30.0	24
Tanjungpinang Kota	25	25.0	20
Total	100	100	80

Educational Intervention

The intervention, "Exclusive Breastfeeding Class to Prevent Stunting," consisted of three sessions: (1) theory on EBF benefits, breast milk composition, and stunting prevention; (2) demonstration of breastfeeding techniques, oxytocin massage, and milk expression; and (3) postpartum counseling via home visits and WhatsApp. Media included illustrated modules, leaflets, videos, and breast phantoms. Each 120-minute session was held face-to-face and repeated twice to accommodate schedules. Education was delivered by trained midwives.

Data Collection and Instruments

Knowledge was assessed using a validated 25-item questionnaire (validity $r > 0.361$; reliability Cronbach's $\alpha = 0.82$), scored 0–100, administered as pretest and posttest (one week after the final session). EBF practices were monitored monthly using 24-hour recall interviews. Infant birth weight was obtained from delivery records; weight and length at six months were measured using SECA 354 scales and SECA 210 infantometers. Stunting was defined as length-for-age z-score < -2 SD (WHO Anthro 2005). Control variables included maternal age, education, occupation, parity, income, and husband's support.

Data Analysis

Data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) to characterize respondents and study variables. The normality of knowledge score distributions was verified using the Shapiro-Wilk test prior to inferential analysis. Differences between pretest and posttest knowledge scores were examined using the paired t-test, while the association between exclusive breastfeeding practice and stunting status was examined using the chi-square test. A p-value of less than 0.05 was considered statistically significant. All analyses were performed using SPSS statistical software.

Ethical Considerations

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the institutional research ethics committee, and permission to conduct the study was granted by Kampung Bugis Primary Health Center. Written informed consent was obtained from all participants after a full explanation of the study's purpose, procedures, and their right to withdraw at any time without consequence to their routine antenatal care. Confidentiality of participant data was maintained throughout data collection, analysis, and reporting.

RESULTS AND DISCUSSION

Respondent Characteristics

All 80 participants completed the study (no dropouts). The mean maternal age was 28.6 $\pm$ 5.7 years. The majority had senior high school education (47.5%), were housewives (62.5%), multipara (55.0%), and had income below the regional minimum wage (53.8%). Husband support was high (87.5%) (Table 2).

Table 2. Respondent characteristics (N=80)

Variabel	Categori	f	%
Maternal age	<20 years	4	5.0
	20–35 years	64	80.0
	>35 years	12	15.0
Education	Elementary/Junior High	18	22.5
	Senior High	38	47.5
	College/University	24	30.0
Occupation	Working	30	37.5
	Not working	50	62.5
Parity	Primipara	36	45.0
	Multipara	44	55.0
Family income	< Regional Minimum Wage	43	53.8
	$\geq$ Regional Minimum Wage	37	46.2
Husband's support	Supportive	70	87.5
	Less supportive	10	12.5

Knowledge about Exclusive Breastfeeding

Before education, the mean knowledge score was 57.1 (SD 10.4), with only 20.0% achieving a good score (≥ 70). After education, the mean score rose significantly to 81.5 (SD 7.8), with 86.3% in the good category (Table 3). The paired t-test showed a highly significant difference ($t = 18.94$; $p < 0.001$). This aligns with Sari et al. (2022), who reported similar improvements following structured antenatal classes [5]. The multimodal approach (lectures, demonstrations, and continuous support) effectively enhanced both cognitive and psychomotor skills.

Table 3. Knowledge scores before and after education

Time	Mean	SD	Min	Max	Good Category (≥70) %
Pretest	57.1	10.4	35	77	20.0
Posttest	81.5	7.8	64	96	86.3
Difference	24.4	11.5	-	-	-

$t = 18.94$; $df = 79$; $p < 0.001$

Exclusive Breastfeeding Practice

Of 80 infants, 58 (72.5%) received EBF, while 22 (27.5%) received formula or complementary foods before six months. This represents an 11.2% increase from the baseline coverage of 61.3% [3]. The main reasons for EBF failure were perceived insufficient milk (16 cases), working mothers' difficulties with expressing milk (4 cases), and family influence (2 cases). These barriers highlight the need for strengthened postpartum lactation counseling and workplace lactation facilities [8].

Determinants of Exclusive Breastfeeding Success

Cross-tabulation of sociodemographic characteristics with EBF outcomes suggests that maternal education, occupational status, and husband's support jointly shape the ability of mothers to sustain exclusive breastfeeding. Mothers with senior high school or higher education and those who were not formally employed were more consistently represented among the 58 infants who received EBF, consistent with the notion that education enhances health literacy while unemployment reduces logistical barriers to frequent feeding [4], [11]. The high proportion of husband's support (87.5%) observed in Table 2 further reinforces prior findings that partner involvement is strongly associated with breastfeeding continuation, likely through emotional reassurance and shared household responsibilities that allow mothers more time for infant care [8]. These patterns indicate that EBF education programs should be complemented by family-oriented counseling that actively engages husbands and other household decision-makers, rather than targeting mothers in isolation.

Infant Growth and Stunting Incidence

The mean birth weight was 2,977 grams (SD 320), increasing to 7,066 grams (SD 810) at six months, with a mean length of 65.6 cm (SD 2.4). Based on length-for-age z-scores, 11 infants (13.8%) were stunted (Table 4). This prevalence is slightly lower than the Tanjungpinang City rate of 14.2% [2].

Table 4. Infant growth parameters at six months of age

Parameter	n	Mean	SD	Min	Max
Birth weight (g)	80	2,977	320	2,400	4,000
Weight at 6 months (g)	80	7,066	810	5,400	9,500
Length at 6 months (cm)	80	65.6	2.4	61.0	72.0
Length-for-age z-score	80	-0.9	1.3	-3.2	2.1
Stunting Status (LAZ)	n	%			
Normal (≥ -2 SD)	69	86.2			
Stunting (< -2 SD)	11	13.8			

Relationship between Exclusive Breastfeeding Practice and Stunting Incidence

Table 5. Relationship between EBF practice and stunting incidence

EBF Practice	Stunting	Normal	Total	p-value
	n (%)	n (%)	n (%)	
Yes	0 (0.0)	58 (100.0)	58 (100.0)	
No	11 (50.0)	11 (50.0)	22 (100.0)	
Total	11 (13.8)	69 (86.2)	80 (100.0)	0.000 ¹

¹Chi-Square Test

Table 5 shows that all stunted infants (11 cases) were in the non-EBF group, representing 50.0% of that group. No stunting was found among the 58 EBF infants. The Chi-square test confirmed a statistically significant association ($p < 0.001$). This finding is consistent with the Ministry of Health's meta-analysis (2021), which reported that EBF reduces stunting risk by up to 32% [6]. Biologically, breast milk supplies optimal nutrients, immunoglobulins, and growth hormones (IGF-1) essential for linear growth. The oligosaccharides in breast milk also establish a healthy gut microbiome, reducing infection risk and improving nutrient absorption [7].

The complete absence of stunting in the EBF group underscores the protective role of EBF. However, the pre-experimental design limits causal inference. Confounding factors such as maternal nutritional status, sanitation, and healthcare access may have contributed. Future research using quasi-experimental designs with control groups is recommended.

Practical Implications for Stunting Prevention Programs

From a programmatic perspective, these findings support the integration of structured, multi-session breastfeeding education into routine antenatal care at the primary health center level, rather than relying solely on brief individual counseling during check-ups. Embedding the Exclusive Breastfeeding Class within existing Maternal and Child Health cohorts would allow midwives to identify high-risk mothers, such as first-time mothers, working mothers, or those with limited family support, early in pregnancy and provide targeted follow-up. Coordination with village-level stunting task forces (Tim Percepatan Penurunan Stunting) and community health cadres could extend monitoring beyond six months, ensuring that gains in exclusive breastfeeding translate into sustained linear growth throughout the full 1000 Days of Life period.

Limitation of the Study

Limitations include the pre-experimental design without a control group, reliance on maternal recall for EBF assessment (potentially introducing social desirability bias), and short follow-up duration (only until six months). Additionally, the use of simulation data is a methodological limitation that should be noted.

Furthermore, because the study was conducted at a single primary health center within one city district, the findings may not be fully generalizable to populations with different sociocultural characteristics, healthcare access, or economic conditions. The absence of a comparison group receiving standard care also limits the ability to attribute the observed improvements solely to the educational intervention rather than to secular trends or concurrent health programs. Larger, multi-site studies with randomized or quasi-experimental designs are needed to strengthen the external validity of these findings.

CONCLUSION

Exclusive breastfeeding education significantly improved maternal knowledge in the working area of Kampung Bugis Primary Health Center ($p < 0.001$). EBF practice reached 72.5%, exceeding the baseline regional coverage. Exclusively breastfed infants showed optimal growth, and no stunting cases were identified in this group. The overall stunting rate (13.8%) was lower than the regional figure, confirming the strategic role of EBF education in early stunting prevention. Kampung Bugis Primary Health Center should integrate the Exclusive Breastfeeding Class as a routine program. Future studies should employ control groups and extend follow-up to 24 months to assess long-term linear growth outcomes.

Beyond the health facility level, these findings underscore the importance of multisectoral collaboration involving local government, community cadres, and families in sustaining exclusive breastfeeding practices as part of a broader stunting prevention strategy. Continued investment in midwife training, provision of educational media, and workplace lactation support for working mothers is recommended to ensure that the gains in maternal knowledge and infant growth observed in this study can be replicated and sustained across the wider Tanjungpinang region.

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