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Determinants of Exclusive Breastfeeding Among Mothers in Buleleng Regency : A Cross-Sectional Study

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ABSTRACT

Background: Exclusive breastfeeding plays a crucial role in supporting infant growth, health, and development during the first six months of life. Despite ongoing breastfeeding promotion efforts, the proportion of infants receiving exclusive breastfeeding remains inadequate in several parts of Indonesia. Identifying factors that influence breastfeeding behavior is essential for developing targeted maternal and child health programs. This study explored determinants associated with exclusive breastfeeding among mothers residing in Buleleng Regency, Bali.

Method: A community-based analytical study with a cross-sectional approach was undertaken between June and July 2025. The study involved 144 mothers who had children aged 6–24 months. Eligible participants were selected from public health service areas through purposive recruitment. Information was gathered through face-to-face structured interviews, and factors related to exclusive breastfeeding were examined using multivariable logistic regression.

Result: Of all respondents, 43.1% reported practicing exclusive breastfeeding during the first six months after birth. After controlling for potential confounding factors, mothers from lower-income households were less likely to exclusively breastfeed than those from higher-income households (AOR=0.20; 95%CI: 0.07–0.60; p=0.005). Receipt of breastfeeding information during the postpartum period was strongly associated with increased odds of exclusive breastfeeding (AOR=23.82; 95%CI: 3.10–182.94; p=0.001). In addition, mode of birth remained significantly related to breastfeeding practice, with mothers who delivered by cesarean section showing higher odds of exclusive breastfeeding than those who delivered vaginally (AOR=4.50; 95%CI: 1.39–15.12; p=0.012).

Conclusion: Exclusive breastfeeding prevalence in Buleleng Regency has not yet reached optimal levels. Household economic status, childbirth-related factors, and postpartum breastfeeding support were identified as important determinants of breastfeeding continuation. Expanding breastfeeding assistance after delivery may contribute to improving exclusive breastfeeding outcomes in community settings.

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INTRODUCTION

Optimal infant feeding during the first six months of life remains a global public health priority. Exclusive breastfeeding provides essential nutrients required for growth while simultaneously supporting immune function, neurodevelopment, and long-term health outcomes. Evidence has consistently demonstrated that infants who are exclusively breastfed experience lower risks of infectious diseases and benefit from improved developmental trajectories compared with those who receive alternative feeding practices (Boy et al., 2023; Martin et al., 2016). Despite these well-established benefits, achieving and sustaining exclusive breastfeeding continues to be challenging in many settings worldwide.

Although substantial progress has been made through international and national breastfeeding promotion initiatives, the prevalence of exclusive breastfeeding remains uneven across populations. Breastfeeding decisions are often influenced by a combination of individual, family, healthcare, and socioeconomic factors. Mothers may encounter challenges such as employment obligations, financial constraints, cultural expectations, inadequate breastfeeding knowledge, limited professional support, or difficulties experienced during the postpartum period. These interconnected barriers frequently contribute to the early introduction of formula milk or complementary foods before the recommended age of six months (Chang et al., 2021; Gutierrez-de-Terán-Moreno et al., 2022; Witten et al., 2020).

In Indonesia, efforts to improve breastfeeding practices have been integrated into maternal and child health programs through antenatal services, postpartum care, and community-based health activities. Nevertheless, exclusive breastfeeding coverage has not yet reached the desired level in several provinces and districts. Variations in breastfeeding outcomes between regions indicate that local contextual factors may substantially influence maternal feeding practices. Differences in economic conditions, cultural norms, family dynamics, and access to healthcare services may contribute to these disparities, highlighting the need for context-specific evidence (Gayatri, 2021; Andhiny et al., 2026; Meher & Zaluchu, 2024).

Previous research has identified a range of determinants associated with breastfeeding continuation. Maternal education, employment status, household economic conditions, delivery method, breastfeeding knowledge, and family support are among the factors most frequently linked to exclusive breastfeeding behavior (Kalhor et al., 2025; Laksono et al., 2021; Hermawati et al., 2025). However, the relative importance of these factors differs across populations. Findings from one setting cannot always be generalized to another because breastfeeding behavior is shaped by local social and healthcare environments.

Particular attention should be given to breastfeeding support received after childbirth. While breastfeeding information is commonly delivered during pregnancy, many practical difficulties arise only after mothers begin caring for and feeding their infants. Concerns regarding milk adequacy, breastfeeding discomfort, infant attachment problems, fatigue, and emotional stress often emerge during the postpartum period and may negatively affect breastfeeding continuation when appropriate support is unavailable (Mahurin-Smith, 2023; Yuen et al., 2022). Consequently, the timing of breastfeeding education may be as important as the content itself.

Several studies have reported positive effects of postpartum counseling, peer-support programs, and structured breastfeeding assistance on maternal confidence and breastfeeding outcomes (Aktürk & Kolcu, 2023; Chipojola et al., 2020; Rodríguez-Gallego et al., 2024; Tseng et al., 2020). Nevertheless, evidence remains limited regarding whether postpartum breastfeeding information exerts a stronger influence on exclusive breastfeeding practices than education provided exclusively during pregnancy, particularly within Indonesian community settings.

Buleleng Regency represents a unique setting for examining breastfeeding behavior because of its diverse demographic and sociocultural characteristics. Although breastfeeding promotion activities are routinely implemented through local healthcare services, empirical evidence regarding

factors associated with exclusive breastfeeding in this area remains scarce. Existing studies conducted in Indonesia have predominantly focused on maternal characteristics, whereas less attention has been directed toward postpartum support mechanisms and the timing of breastfeeding education. Generating local evidence is therefore important for informing interventions that are responsive to community needs.

Accordingly, this study aimed to identify factors associated with exclusive breastfeeding among mothers in Buleleng Regency, Bali. The analysis focused on socioeconomic characteristics, delivery-related factors, breastfeeding information, and support systems that may influence breastfeeding continuation during the first six months after childbirth. The findings are expected to provide evidence for strengthening breastfeeding promotion and postpartum support programs at both community and healthcare-service levels.

METHODS

Study Design and Setting

This analytical cross-sectional study was undertaken in Buleleng Regency, Bali, Indonesia, from June to July 2025. Data were obtained through community-based maternal and child health services, including integrated health posts (Posyandu) and community health centers (Puskesmas). Mothers were interviewed retrospectively to obtain information regarding infant feeding practices during the first six months after childbirth.

Population and Sample

The target population comprised mothers with children aged 6–24 months living in Buleleng Regency. Sample size estimation was performed using the formula for cross-sectional studies with a 95% confidence level and an expected prevalence of exclusive breastfeeding derived from previous national evidence (Gayatri, 2021). The minimum required sample was 138 participants; however, 144 eligible mothers were successfully enrolled and included in the final analysis.

Participant recruitment was conducted through Posyandu and Puskesmas service networks using a purposive sampling approach. Mothers were considered eligible when they had a child aged between 6 and 24 months, resided in Buleleng Regency during the study period, and provided consent to participate. Mothers whose infants had medical conditions that could influence feeding practices, as well as those unable to recall breastfeeding experiences during the first six months postpartum, were excluded from the study.

Variables and Measurement

Exclusive breastfeeding status served as the outcome variable. In accordance with the World Health Organization definition, infants were classified as exclusively breastfed when they received only breast milk during the first six months of life, with the exception of prescribed medications, vitamin preparations, or mineral supplements. Breastfeeding practice was subsequently categorized as exclusive or non-exclusive breastfeeding.

Explanatory variables included maternal age, educational attainment, employment status, household income, mode of delivery, timing of breastfeeding information, husband support, family support, and healthcare worker support. Perceived support variables were measured using Likert-scale items adapted from previous breastfeeding studies. Total scores were categorized into poor/moderate support and good support.

Instrument and Data Collection

Information was gathered using a structured questionnaire adapted from previously published studies examining determinants of breastfeeding practices. Prior to data collection, the instrument underwent assessment for content relevance, clarity, and comprehensibility. Reliability testing demonstrated satisfactory internal consistency, with Cronbach's alpha coefficients exceeding 0.70 for support-related measures.

Enumerators received training before field implementation to ensure uniform data collection procedures. Eligible participants were provided with information regarding the study objectives and procedures before written informed consent was obtained. Data collection was carried out through direct face-to-face interviews using the questionnaire. Each interview lasted approximately 20–30 minutes. Ongoing supervision and routine data checks were performed throughout the study period to maintain data completeness and consistency.

Data Analysis

Data analysis was conducted in several stages. Participant characteristics were first summarized using descriptive statistics. Bivariate analyses were subsequently performed to examine the relationship between independent variables and exclusive breastfeeding status. Variables demonstrating an association at $p<0.25$ in the bivariate analysis were considered for inclusion in the multivariable logistic regression model.

The final model was used to identify factors independently associated with exclusive breastfeeding. The strength of associations was expressed as adjusted odds ratios (AORs) with corresponding 95% confidence intervals (CIs). Statistical significance was established at a p-value of less than 0.05.

Ethical Consideration

Ethical approval for this study was granted by the Ethics Committee of the Faculty of Medicine, Udayana University (No. 1393/UN14.2.2.VII.14/LT/2023).

RESULTS AND DISCUSSION

Results

Participant Characteristics

A total of 144 eligible mothers participated in the study. As presented in Table 1, the mean maternal age was 28.5 ± 5.2 years, with most respondents belonging to the 25–34-year age group (58.3%). Senior high school was the most frequently reported educational attainment (45.8%), while 31.3% of participants had completed higher education. Homemakers accounted for nearly two-thirds of the sample (62.5%), and 55.6% of households reported incomes below the regional minimum wage. Vaginal delivery was reported by 68.8% of mothers, whereas 31.2% had undergone cesarean section.

The proportion of mothers who practiced exclusive breastfeeding for the first six months was 43.1% (62/144). Among mothers who did not maintain exclusive breastfeeding, perceived insufficient milk supply emerged as the leading reason (38.5%), followed by work-related commitments (24.4%), early introduction of complementary foods (18.8%), and formula feeding before six months of age (18.3%).

Table 1. Characteristics of Participants (n=144)

Variables	Category	n	%
Maternal age	<25 years	32	22.2
	25–34 years	84	58.3
	≥35 years	28	19.5
Education level	Junior high school	33	22.9
	Senior high school	66	45.8
	Higher education	45	31.3
Occupation	Homemaker	90	62.5
	Employed	54	37.5
Household income	≥ Regional minimum wage	64	44.4
	< Regional minimum wage	80	55.6
Delivery type	Vaginal delivery	99	68.8
	Cesarean section	45	31.2
Exclusive breastfeeding	Yes	62	43.1
	No	82	56.9

Factors Associated with Exclusive Breastfeeding

Table 2. Bivariate Analysis of Factors Associated with Exclusive Breastfeeding Practice

Variables	Category	Exclusive Breastfeeding n (%)	Non-Exclusive Breastfeeding n (%)	cOR	95% CI	p-value
Household income	≥ Regional minimum wage	38 (59.4)	26 (40.6)	Ref		
	< Regional minimum wage	24 (30.0)	56 (70.0)	0.29	0.14–0.58	0.001
Delivery type	Vaginal delivery	37 (37.4)	62 (62.6)	Ref		
	Cesarean section	25 (55.6)	20 (44.4)	2.09	1.01–4.34	0.046
Timing of breastfeeding information	During pregnancy	19 (24.4)	59 (75.6)	Ref		
	During postpartum period	43 (65.2)	23 (34.8)	5.80	2.78–12.09	<0.001
Husband support	Poor/Moderate	20 (31.7)	43 (68.3)	Ref		
	Good	42 (51.9)	39 (48.1)	2.32	1.16–4.64	0.017
Family support	Poor/Moderate	23 (35.4)	42 (64.6)	Ref		
	Good	39 (49.4)	40 (50.6)	1.78	0.90–3.50	0.096
Healthcare worker support	Poor/Moderate	21 (32.8)	43 (67.2)	Ref		
	Good	41 (51.2)	39 (48.8)	2.15	1.08–4.28	0.028
Maternal occupation	Homemaker	43 (47.8)	47 (52.2)	Ref		
	Employed	19 (35.2)	35 (64.8)	0.59	0.29–1.21	0.151
Education level	Junior/Senior high school	39 (39.4)	60 (60.6)	Ref		
	Higher education	23 (51.1)	22 (48.9)	1.61	0.79–3.28	0.190

Several variables demonstrated meaningful associations with breastfeeding continuation in the initial analysis. Mothers from households earning below the regional minimum wage showed lower odds of maintaining exclusive breastfeeding compared with mothers from higher-income households (cOR=0.29; 95%CI: 0.14–0.58; p=0.001). In contrast, receiving breastfeeding information during the postpartum period was associated with substantially greater odds of exclusive breastfeeding than receiving information only during pregnancy (cOR=5.80; 95%CI: 2.78–12.09; p<0.001). Delivery through cesarean section was also positively associated with exclusive breastfeeding practice (cOR=2.09; 95%CI: 1.01–4.34; p=0.046).

Variables with p-values below 0.25 in the initial analysis were entered into the multivariable logistic regression model. These variables included household income, delivery type, timing of

breastfeeding information, husband support, family support, healthcare worker support, maternal occupation, and educational level. After adjustment for potential confounding variables, household income, delivery type, and timing of breastfeeding information continued to demonstrate significant associations with exclusive breastfeeding in the final model (Table 3).

Table 3. Factors Associated with Exclusive Breastfeeding Practice

Variables	Category	AOR	95% CI	p-value
Household income	≥ Regional minimum wage	Ref		
	< Regional minimum wage	0.20	0.07–0.60	0.005
Delivery type	Vaginal delivery	Ref		
	Cesarean section	4.50	1.39–15.12	0.012
Timing of breastfeeding information	During pregnancy	Ref		
	During postpartum period	23.82	3.10–182.94	0.001
Husband support	Poor/Moderate	Ref		
	Good	1.45	0.68–3.09	0.331
Family support	Poor/Moderate	Ref		
	Good	1.22	0.57–2.61	0.602
Healthcare worker support	Poor/Moderate	Ref		
	Good	1.89	0.81–4.39	0.140
Maternal occupation	Homemaker	Ref		
	Employed	0.74	0.31–1.79	0.504
Education level	Junior/Senior high school	Ref		
	Higher education	1.36	0.58–3.17	0.478

The multivariable logistic regression model demonstrated acceptable goodness of fit based on the Hosmer Lemeshow test (p=0.721). Multicollinearity assessment showed acceptable VIF values (<2.5) for all independent variables. Household income, delivery type, and timing of breastfeeding information remained significantly associated with exclusive breastfeeding practice after adjustment for potential confounding variables. However, the wide confidence intervals observed for several variables, particularly postpartum breastfeeding information, suggest limited estimate precision and possible model instability; therefore, these findings should be interpreted cautiously.

Discussion:

This study found that the prevalence of exclusive breastfeeding among mothers in Buleleng Regency remains below the targets recommended by national and international public health programs. Less than half of the participating mothers reported maintaining exclusive breastfeeding throughout the first six months after childbirth. These findings suggest that breastfeeding practices continue to be influenced by a combination of maternal, socioeconomic, and healthcare-related factors. Comparable patterns have been observed in several developing countries where breastfeeding promotion initiatives have been widely implemented, yet exclusive breastfeeding coverage remains below expected levels (Gayatri, 2021; WHO, 2025).

Household income emerged as an important determinant of exclusive breastfeeding practice. Mothers from lower-income households were less likely to exclusively breastfeed their infants compared with mothers from households with higher economic status. Financial limitations may influence breastfeeding behavior through multiple pathways, including increased psychological stress, reduced access to breastfeeding-related resources, and competing household responsibilities. Economic constraints may also restrict opportunities to obtain professional breastfeeding counseling and postpartum support services. Similar findings have been reported in previous studies demonstrating that socioeconomic disadvantage is associated with lower exclusive breastfeeding rates and earlier breastfeeding cessation (Chang et al., 2021; Ekholuenetale et al., 2021; Mohammed et al., 2023; Nazari et al., 2021).

The findings also revealed a significant association between mode of delivery and breastfeeding outcomes. Mothers who delivered by cesarean section were more likely to maintain exclusive breastfeeding than those who experienced vaginal delivery. This result differs from findings reported in many previous studies, which identified cesarean delivery as a barrier to breastfeeding initiation due to postoperative pain, delayed mother–infant contact, and challenges during physical recovery that may interfere with early breastfeeding practices (Li et al., 2021; Peng et al., 2024; Zhang et al., 2019). A possible explanation for the present finding is that mothers undergoing cesarean delivery may have received more intensive monitoring, lactation assistance, and breastfeeding counseling during hospitalization. Such additional support may facilitate breastfeeding continuation during the early postpartum period. Similar improvements in breastfeeding outcomes among mothers receiving structured lactation support following cesarean delivery have been documented previously (He et al., 2025). Nevertheless, the relatively wide confidence interval observed in this study indicates limited precision of the estimate; therefore, this finding should be interpreted cautiously and confirmed through future studies involving larger sample sizes.

Another noteworthy finding relates to the timing of breastfeeding information. Mothers who received breastfeeding education during the postpartum period demonstrated a substantially greater likelihood of maintaining exclusive breastfeeding than those who received information only during pregnancy. This result suggests that educational interventions may be more effective when delivered at a time when mothers are actively experiencing breastfeeding challenges and can immediately apply the information received to real-life infant feeding situations. Postpartum education may therefore provide more practical benefits than education delivered solely during the antenatal period.

The postpartum period is frequently characterized by various physical and emotional challenges, including fatigue, breastfeeding discomfort, nipple pain, concerns regarding milk adequacy, and difficulties with infant attachment or latching. In the absence of adequate guidance and support, these challenges may undermine maternal confidence and increase the likelihood of introducing formula milk or complementary foods earlier than recommended (Mahurin-Smith, 2023; Yuen et al., 2022). Consequently, postpartum breastfeeding support should not be viewed merely as an educational activity but also as an intervention aimed at strengthening maternal self-efficacy and confidence in breastfeeding management. Previous evidence has demonstrated that postpartum counseling, peer-support interventions, and individualized breastfeeding guidance can positively influence breastfeeding continuation and improve exclusive breastfeeding outcomes (Aktürk & Kolcu, 2023; Chipojola et al., 2020; Rodríguez-Gallego et al., 2024; Saniel et al., 2021; Tseng et al., 2020).

Although husband support, family support, and healthcare worker support showed positive associations with exclusive breastfeeding in the bivariate analysis, these variables did not remain statistically significant after adjustment for potential confounding factors. This finding should not be interpreted as evidence that social support is unimportant for breastfeeding success. Rather, it may indicate that the effects of social support operate indirectly through mechanisms such as improved maternal confidence, enhanced access to breastfeeding information, better emotional wellbeing, and stronger coping abilities during the postpartum period. Existing literature consistently highlights the contribution of family involvement and healthcare professional support in promoting positive breastfeeding experiences and improving breastfeeding continuation rates (Abbass-Dick et al., 2015; Amoo et al., 2022; Bueno-Gutiérrez et al., 2021). The lack of statistical significance observed in the adjusted model may therefore reflect limitations related to sample size or interactions among variables included in the analysis.

The findings of this study reinforce the need for comprehensive and multidimensional breastfeeding promotion strategies. Improving breastfeeding outcomes requires more than increasing maternal knowledge alone; it also involves strengthening postpartum support systems

and addressing broader social and economic barriers faced by mothers. Expanding access to postpartum counseling services, community-based breastfeeding support groups, and family-centered breastfeeding interventions may help mothers sustain exclusive breastfeeding throughout the first six months of life. Previous studies have similarly reported that continuous breastfeeding assistance and peer-support programs contribute positively to maternal confidence and breastfeeding continuation (Kim et al., 2018; Saniel et al., 2021).

Overall, the findings suggest that exclusive breastfeeding is influenced by a complex interplay of socioeconomic circumstances, childbirth experiences, and postpartum breastfeeding support. Efforts to strengthen breastfeeding assistance after delivery and ensure equitable access to breastfeeding education may represent practical strategies for improving exclusive breastfeeding coverage in Buleleng Regency and other communities with similar characteristics. Future studies involving larger populations and different sociocultural settings are warranted to further clarify the mechanisms through which these factors influence breastfeeding behavior.

Implications:

These findings have several practical and policy implications. Breastfeeding promotion programs should be strengthened, particularly among mothers from low-income households who may face greater barriers to maintaining exclusive breastfeeding. Financial and social support programs may help reduce economic burdens that potentially interfere with breastfeeding practices. In addition, breastfeeding support should continue beyond pregnancy and be strengthened during the postpartum period. Continuous postpartum assistance through peer support groups, home visits, and mobile health-based education may help mothers overcome breastfeeding difficulties during the first six months after delivery. Previous studies have shown that peer counseling and breastfeeding support groups may improve exclusive breastfeeding practices among mothers (Saniel et al., 2021).

Healthcare facilities should also strengthen lactation support services by providing breastfeeding counseling and follow-up assistance before mothers are discharged from healthcare facilities. Family-centered breastfeeding interventions involving husbands and other family members may further support a breastfeeding-friendly home environment. Furthermore, workplace policies that support breastfeeding, including adequate maternity leave, lactation rooms, and flexible breastfeeding time, remain important to support exclusive breastfeeding among working mothers.

Limitations:

This study has several limitations that should be acknowledged when interpreting the findings. Because the analysis was based on cross-sectional observational data, the identified relationships cannot be interpreted as causal associations. Information regarding breastfeeding practices and social support was obtained through maternal self-report, which may have been affected by memory inaccuracies or the tendency to provide socially acceptable responses. In addition, the relatively wide confidence intervals observed for several variables suggest limited estimate precision and indicate the need for further studies involving larger populations. The study also did not include qualitative exploration; therefore, deeper sociocultural and personal experiences related to breastfeeding behavior within the Balinese context could not be fully explored.

CONCLUSION

Exclusive breastfeeding coverage among mothers in Buleleng Regency remains below recommended public health targets. The findings of this study indicate that household economic status, delivery type, and timing of breastfeeding information were associated with breastfeeding continuation during the first six months after childbirth. Mothers who received breastfeeding education during the postpartum period demonstrated a greater likelihood of maintaining exclusive breastfeeding compared with mothers who received information only during pregnancy.These findings emphasize the importance of strengthening postpartum breastfeeding support through healthcare services and community-based interventions. Continuous counseling, family involvement, and accessible breastfeeding assistance may help mothers overcome breastfeeding difficulties during the postpartum period. Further studies involving larger populations and broader sociocultural exploration are recommended to better understand contextual factors influencing breastfeeding behavior in Indonesia.

AUTHOR CONTRIBUTION STATEMENT

LM, LNA, and RTH designed and planned the study. LM, LNA, RTH, and INK collected the data, while INK and LM analyzed the data and interpreted the findings. Both LM and INK wrote the draft. Following their assessment of the results, LM, LNA, RTH, and INK approved the final draft.

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