



Published by  
Department of Public Health and Preventive  
Medicine, Faculty of Medicine,  
Udayana University

<sup>1</sup>National Population and Family Planning  
Board, East Jakarta, Indonesia

\*Correspondence to: [maria.gayatri.bkkbn@gmail.com](mailto:maria.gayatri.bkkbn@gmail.com)

## Relationship between cesarean section and early initiation of breastfeeding in Indonesia

Maria Gayatri<sup>1\*</sup>

### ABSTRACT

**Background and purpose:** Breastfeeding initiation is internationally recommended due to its benefits on maternal and child health. The study aims to determine the relationship between mode of delivery and early breastfeeding initiation among women who delivered in health facilities.

**Methods:** The study was based on The Indonesia Demographic and Health Survey 2017. There were 5,369 women whose children were born in the last 24 months preceding the survey in health facilities in Indonesia. Descriptive statistics and binary logistic regression were used for data analysis. The complex sample design was performed for analyses.

**Results:** Of the women who had given birth to at least 24 months preceding the survey in health facilities, 57 percent of women were found to practice breastfeeding initiation. The likelihood of breastfeeding initiation among women who delivered in health facilities was associated with mode of delivery, which women with cesarean delivery (OR=0.33; 95%CI: 0.29-0.38) were less likely to practice breastfeeding initiation compared with those with normal vaginal delivery after adjusted by socio-economic factors. Moreover, women aged 35-49 years and non-working women were found to have higher probabilities to practice breastfeeding initiation.

**Conclusion:** Maternal age, working status, and type of delivery were significantly influencing the practice of early initiation of breastfeeding among women who delivered in health facilities. Policy and intervention to encourage and support early initiation of breastfeeding should be taken into consideration by public health professionals and health providers. Comprehensive breastfeeding counseling should be a part of health care training to encourage moms to start nursing as soon as possible, especially for mothers who have caesarean deliveries. It is important to ensure the implementation of breastfeeding policy on the company's worksite support policy.

**Keywords:** breastfeeding initiation; cesarean section, exclusive breastfeeding, health facility

## INTRODUCTION

Early initiation of breastfeeding (EIBF) within one hour after delivery is one of the public health challenges.<sup>1</sup> Breastfeeding initiation is internationally recommended due to its benefits on maternal and child health such as reducing the risk of hypothermia, and developing natural immunity.<sup>1,2</sup> Early initiation of breastfeeding reduces the risk of neonatal mortality and severe morbidity.<sup>2</sup>

Many health facilities have adopted the Baby-friendly hospital initiative (BFHI) launched by WHO and UNICEF in 2018 to promote and support breastfeeding in health facilities that provide maternity and newborn services. The ten steps to successful breastfeeding are essential for increasing breastfeeding practices by providing maternity and newborn services including the early initiation of breastfeeding after delivery.<sup>3</sup> Moreover, delivery in health facilities will benefit mothers because they can get close monitoring from skilled attendants to start the initiation of breastfeeding as soon as possible after delivery.<sup>4</sup> During EIBF, it is important to give infants the first breast milk (colostrum) as a highly nutritious food to develop newborn antibodies and reduce the risk of microbial translocation.<sup>2,5</sup> EIBF may help mothers to develop their close bonding with the newborn.<sup>2</sup> After delivery, it is recommended to have the babies placed in skin-to-skin contact with the mothers immediately.

EIBF practices in Indonesia improved gradually from 44% in 2007 and 49% in 2012 to 57% in 2017, but the rates were still lower compared with the neighboring countries in South-East Asia like Cambodia (63%), Myanmar (67%), and Timor-Leste (75%).<sup>6,7</sup> The previous studies show that EIBF increased the chances of exclusive breastfeeding in the first six months and reduced the risk of neonatal mortality.<sup>2,8</sup> A study in India shows that women who did not practice EIBF had a nearly threefold higher risk of neonatal mortality compared with women who breastfed their babies within the first hour of life.<sup>9</sup>

Globally, the rate of cesarean section increased which accounted for more than one in five (21%) deliveries. It is predicted that the rate of the cesarean section will rise to almost one in three (29%) in the next decade, 2030.<sup>10</sup> Similarly, in Indonesia, about 17.6% of all births occurred through cesarean section.<sup>11</sup> A meta-analysis study in Sub-Saharan Africa revealed that the rates of EIBF were lower in mothers who delivered through cesarean section compared to those who delivered through normal vaginal delivery with adjusted prevalence ratios ranging between 0.24 (95% CI: 0.17-0.33) and 0.89 (95% CI: 0.78-1.00).<sup>12</sup> Moreover, a meta-analysis of 53 studies in 33 countries showed that cesarean deliveries were associated with a lower rate of EIBF (pooled OR=0.57) compared with women who delivered through normal births.<sup>13</sup>

Theoretical framework such as Social Cognitive Theory (SCT) may aid the understanding of the determinants of EIBF. SCT has constructs, namely knowledge, perceived self-efficacy, outcome expectations, health goals, perceive facilitators and social support, and barriers.<sup>14</sup> Previous studies showed that some factors were influencing the practices of EIBF such as demographic, socio-economic, and healthcare utilization factors. Demographic factors contain mother's age,<sup>1</sup> birth order,<sup>1,4,5,15</sup> and birth interval.<sup>16</sup> Socio-economic factor influencing EIBF were household wealth index,<sup>1,4,15</sup> mother's working status,<sup>1,4,16-18</sup> maternal education,<sup>1,4,5,16</sup> and place of residence.<sup>4,5,16</sup> Healthcare utilization factors that affecting EIBF were place of delivery,<sup>1,4,15-17</sup> mode of delivery,<sup>1,4,15-17,19</sup> type of delivery assistance,<sup>1,4,5,15-17</sup> and antenatal clinic visits.<sup>1,16</sup> The study aims to determine the relationship between mode of delivery and early breastfeeding initiation among women who delivered in health facilities.

## METHODS

The study is based on The Indonesia Demographic and Health Survey (IDHS) 2017. IDHS was a cross-sectional and nationally representative survey that covered all 34 provinces in Indonesia. The survey used a multistage sampling design. The first stage consisted of 1,970 selected census enumeration areas (EA) with probability proportional of size from rural and urban areas based on the households listed in the 2010 Indonesian Population Census. Secondly, a systematic sample of households was identified in each selected census block with a cluster of 25 households.

A structured questionnaire was used for interviewing women of reproductive age. Regarding this study, the questionnaire captured information about the last pregnancies such as maternal age, breastfeeding initiation, and place of delivery. Socio-demographic details of the mother were also collected such as mother's highest educational attainment, wealth index, place of residence, and occupational status.

The inclusion criteria for this study were mothers, aged 15-49 years, who gave birth to the youngest child in the last 24 months living with mother, and who delivered the alive baby in health facilities such as government hospitals/clinics, government health centre, government mobile clinic, government-private midwife, village health post, private hospital/clinic, private clinic/maternity home, private obstetrician and private midwife. The exclusion criteria were mothers who had not completed responses on their breastfeeding status and mothers who delivered twins or triplets or quadriplets babies. Data collection was carried out between July and September 2017. We restricted our analyses to the 5,369 women who delivered the last child in the last 24 months preceding the survey in health facilities in Indonesia.

The dependent variable is EIBF that calculated by the proportion of infants aged 0-23 months who were placed to their mother's breast within an hour after delivery. The predictors in this study consist of women's age, education, occupation, wealth status, mode of delivery and place of residence. Women's age is categorized as 15-19 years, 20-34 years and 35-49 years. Work status is categorized as working and not working. Education is categorized as primary or lower, secondary and higher. Household's wealth index is categorized into poor, middle and rich. Wealth index is calculated based on the household's ownership of asset and facilities (television, telephone, vehicle, and housing construction). Wealth index is already calculated and categorized by Demographic and Health Survey. Mode delivery consists of normal vaginal and caesarean section. Lastly, place of residence is categorized as rural and urban.

We used descriptive analysis of the practice of EIBF for the first analysis. The analyses in this study were weighted to adjust for differences in the probability of sampling techniques due to selection and non-response. Secondly, bivariate and multivariate analyses were assessed to determine the covariates on the two interest variables. The results of logistic regression were presented as the partial proportional odds model. The model had a p-value of <0.05. All analyses were undertaken in Stata 15.1. The complex sample design was performed for analyses. STATA command "svy" and "logistic" was used to fit the partial proportional odds model.

The Institutional Review Board determined that the Demographic and Health Survey (DHS) Program (DHS-7) project had complied with the requirements of 45 CFR 46, "Protection of Human Subjects," before the surveys were conducted (ICF IRB FWA00000845). Before being questioned for the survey, study participants signed an informed consent form. This study uses the IDHS dataset with permission from The Demographic and Health Survey (DHS) Program. The IDHS 2017 data for this study did not contain any personal identification.

## RESULT

Table 1 shows the characteristics of the respondents of 5,369 women aged 15-49 years at the births of their youngest child and delivered in the health facilities. More than 70% of the participants were aged 20-24 years and delivered their last child with normal vaginal delivery. About 62% of the respondents had secondary education. Half of the women were working and lived in urban areas. Concerning the wealth status of the household, about 45% were rich, 21% were middle and 34% were poor. Of the women who had given birth to at least 24 months preceding the survey in health facilities, the proportion of EIBF was about 57.3% in the overall female population.

**Table 1.** Proportion of women who practiced early initiation of breastfeeding (EIBF) and delivered in health facilities, IDHS 2017

Characteristics	EIBF n=3,076 (57.3%)	Total n=5,369
Age		
– 15-19 years	109 (3.53%)	211 (3.93%)
– 20-34 years	2,210 (71.85%)	3,861 (71.91%)
– 35-49 years	757 (24.61%)	1,297 (24.16%)
Education		
– Primary or lower	627 (20.39%)	1,067 (19.88%)
– Secondary	1,895 (61.60%)	3,312 (61.69%)
– Higher	554 (18%)	990 (18.43%)
Occupation		
– Not working	1,767 (57.45%)	3,000 (55.88%)
– Working	1,309 (42.55%)	2,369 (44.12%)
Wealth status		
– Poor	1,069 (34.74%)	1,803 (33.59%)
– Middle	663 (21.54%)	1,139 (21.21%)
– Rich	1,345 (43.72%)	2,427 (45.20%)
Mode of delivery		
– Normal vaginal	2,614 (84.98%)	4,130 (76.93%)
– Cesarean	462 (15.02%)	1,239 (23.07%)
Place of residence		
– Urban	1,695 (55.11%)	2,911 (54.22%)
– Rural	1,381 (44.89%)	2,458 (45.78%)

Table 2 presents bivariate (crude odds ratios) and multivariate (adjusted odds ratios) analyses of EIBF. The bivariate findings show that the practice of EIBF was associated with women's age, occupation, and mode of delivery. The significant predictors in bivariate analysis were then included in the multivariate analysis. Based on the multivariate analysis in Table 2 (the last column), women aged 35-49 years (AOR=1.58; 95%CI: 1.17-2.14) were more likely to practice breastfeeding compared with those women aged 15-19 years. Not working women (AOR=1.18; 95%CI: 1.05-1.33) were more likely to practice EIBF compared to working women. Moreover, the likelihood of breastfeeding initiation among women who delivered in health facilities was associated with mode of delivery, which women with cesarean delivery (AOR=0.33; 95%CI: 0.29-0.38) were less likely to practice breastfeeding initiation compared to those with normal vaginal delivery after adjusted by

socio-economic factors.

**Table 2.** Determinants of early initiation of breastfeeding among women who delivered in health facilities, IDHS 2017

Characteristics	Crude Odds Ratios (95%CI)	Adjusted Odds Ratios (95%CI)
Age		
15-19 years	Ref	Ref
20-34 years	1.26 (0.96-1.67)	1.33 (1.00-1.76)
35-49 years	1.32 (1.01-1.77)**	1.58 (1.17-2.14)**
Education		
Primary or lower	Ref	
Secondary	0.94 (0.82-1.08)	
Higher	0.89 (0.75-1.06)	
Occupation		
Working	Ref	Ref
Not working	1.16 (1.04-1.29)**	1.18 (1.05-1.33)**
Wealth status		
Poor	Ref	
Middle	0.96 (0.82-1.11)	
Rich	0.85 (0.76-0.97)	
Mode of delivery		
Normal vaginal	Ref	Ref
Cesarean	0.35 (1.30-1.39)**	0.33 (0.29-0.38)**
Place of residence		
Urban	Ref	
Rural	0.92 (0.82-1.02)	

Note: \*\*significant <0.05; CI: Confidence Interval; Ref: reference group

## DISCUSSION

The study examined the impact of cesarean section on EIBF among women who delivered in health facilities in Indonesia. The prevalence of EIBF among infants aged 0-23 months and whose mothers delivered in the health facilities is 57.3%. Based on the guidelines from WHO and UNICEF, this EIBF prevalence is categorized as good because it is fall between 50% and 89%.<sup>20</sup> This study shows that among women who delivered in health facilities, about 23% of mothers delivered via cesarean section. Of greater concern, only a small proportion (37.3%) of mothers who delivered through cesarean delivery reported having initiation breastfeeding in the first hour. The study shows a little difference in EIBF between mothers who delivered by cesarean section and normal vaginal delivery in Indonesia. This study also indicates that maternal age (35-49 years), not working mothers, and normal vaginal delivery were significantly influencing the practices of EIBF within one hour of delivery.

The mode of delivery is one important factor that affects breastfeeding practices among newborn mothers. Our findings confirm the results that cesarean delivery is related to lower EIBF practices compared to vaginal delivery which findings are similar to other studies.<sup>1,5,12,15-17,19,21-23,24</sup> The time needed for recovery after cesarean section may delay the onset of lactation.<sup>4,25</sup> The effect of anesthesia during cesarean delivery, prolonged labor, maternal-infant separation, and critical condition of mothers or newborn babies after C-section

delivery may delay the practice of EIBF.<sup>1,4,5,23,26</sup> Moreover, among cesarean mothers, the hormonal system that induces lactogenesis is thought to be disrupted following cesarean deliveries, either due to maternal stress or decreased oxytocin secretion, and this can obstruct milk production.<sup>27-29</sup>

The increasing cesarean section rates in the future and its impact on breastfeeding practices deserve more attention as a major public health concern. Due to the positive impact of early initiation of breastfeeding on maternal and infant health, it is needed to improve women's knowledge and awareness of healthy breastfeeding practices. It is suggested to promote skin-to-skin contact between mother and her babies that can improve the EIBF practices then continue to practice exclusive breastfeeding in the first six months of life. Moreover, psychological supports from family and health providers are needed to increase the confidence in practicing EIBF among new mothers even though they are in critical condition after cesarean delivery.<sup>26</sup> Establishing successful EIBF is important to ensure the babies receive the nutritious colostrum and help mothers to return their uterus to normal size.<sup>12</sup>

Guidelines are needed to improve the practice of EIBF and reduce breastfeeding difficulties especially among mothers who delivered their babies via cesarean delivery. Moreover, the promotion of the benefits of EIBF needs to be improved, so mothers will be more informed and confident to give their first breast milk to their newborns. Mother-newborn infant interactions and bonding during the first hour of life are essential for breastfeeding success.<sup>13</sup> Regardless of the mode of delivery, EIBF should be supported and encouraged for maternal and infant health.

Among women who delivered in health facilities, age has a significant impact on the practice of EIBF. It may be attributable to the increased knowledge and experience among older women (aged 35-49 years) compared to younger women (aged 15-19 years). In this research, older women are related to higher parity compared to younger women. The previous study finds that multiparous women are more likely to practice EIBF because they have more experiences from the previous delivery.<sup>19</sup>

This study shows that non-working women are more likely to practice EIBF than worker women. It is better to provide lactation counselors especially for working women, so when they give birth, they can deal with the breastfeeding problem after delivery.<sup>18</sup> Worker women may continue their breastfeeding in the workplace. Therefore, the supports from the workplace like providing lactation room for pumping the breastmilk and preservation equipment to keep the breastmilk, are important to improve the duration of breastfeeding.

This study has some strengths. The coverage of the survey is nationally representative of 34 provinces in Indonesia, so the findings of this study can be generalized for women who have 0-23 months baby and are delivered in the health facilities in Indonesia. Additionally, due to the national coverage of the survey, this study is based on a large sample size that is more robust for analysis. However, it also has a limitation that the survey data was based on respondent's self-assessment which has the risk of recall bias related to the variables used in this study.

## CONCLUSION

About 57% of women who delivered in health facilities had initiated breastfeeding within one hour. The study clearly shows that the practices of EIBF were lower among women who delivered via cesarean section compared to vaginal delivery. Maternal age and working status were significantly influencing the practice of EIBF among women who delivered in health facilities. Therefore, education and promotion of breastfeeding initiation need to be improved, so couples can enhance their knowledge and awareness of the benefits of breastfeeding initiation then implement it. Moreover, the appropriate guideline for new mothers especially after

cesarean delivery is needed to improve the practice of early initiation of breastfeeding. Future studies would be needed to evaluate the effects of workplace breastfeeding policy on infant feeding practices and their productivity or achievement in the workplace.

## ACKNOWLEDGMENT

The author would like to acknowledge Measure DHS for providing the IDHS data.

## AUTHOR CONTRIBUTION

MG: conceptualization, methodology, data management and analysis, interpretation of the results, drafting of the article, reviewing and editing of the article.

## CONFLICT OF INTEREST

The author has declared that no competing interest exist.

## FUNDING

This research did not receive any specific funding from the public, commercial or non-for-profit sectors.

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