Jurnal Berkala Epidemiologi
Volume 11 No 2. May 2023. 142 – 150
p-ISSN: 2301-7171; e-ISSN: 2541-092X

DOI: 10.20473/jbe.v11i22023.142–150
https://e-journal.unair.ac.id/JBE/
Email: jbe@fkm.unair.ac.id / jbepid@gmail.com

JBE Jurnal Berkala EPIDEMIOLOGI

Jurnal Berkala
EPIDEMIOLOGI
PERIODIC EPIDEMIOLOGY JOURNAL

ORIGINAL ARTICLE

PREDICTORS OF EARLY INITIATION OF BREASTFEEDING (EIBF) IN SULAWESI ISLAND: A POPULATION-BASED STUDY

Prediktor Praktik Inisiasi Menyusui Dini (IMD) pada Ibu di Pulau Sulawesi

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ARTICLE INFO

Article History:
Received June, 13th, 2022
Revised form July, 19th, 2022
Accepted October, 5th, 2022
Published online May, 30th, 2023

Keywords:
Early initiation of breastfeeding;
Exclusive breastfeeding;
Neonatal mortality;
mother

Kata Kunci:
inisiasi menyusui dini;
ASI eksklusif;
kematian neonatus;
ibu

ABSTRACT

Background: Early initiation of breastfeeding (EIBF) is pivotal to the success of exclusive breastfeeding and plays an important role not only in reducing infection-related neonatal mortality but also in providing protection in the next period of life. **Purpose:** This study aims to identify predictive factors of early breastfeeding practices on Sulawesi Island. **Methods:** A cross-sectional study based on population by using data from the Indonesia Demographic and Health Surveys (IDHS) in 2017 was conducted on 1,040 women who had given live birth in 6 provinces on Sulawesi Island. The analysis used bivariate and multivariate logistic regression with predictive models for complex sample design, adjusted for confounders to examine the relationship of EIBF with independent variables. **Results:** The study showed that 50.58% of women practiced EIBF on Sulawesi Island. Significantly, and adjusted for confounder, it found the predictive factors of EIBF practice consecutively, singleton birth being the factor with the highest association value (aOR:11.35, 95%CI (0.00-0.07)), skin-to-skin contact (aOR:3.05,95%CI (2.22–4.21)), normal delivery (aOR:2.94, 95%CI (1.94–4.45)) and delivery accompanied by family (aOR: 1.68,95% CI (1.06–2.67)) and parity factor >1 (aOR: 1.52,95% CI (1.10–2.10)). **Conclusion:** The fulfillment of education related to the urgency of implementing EIBF to pregnant women and their families as a support system as well as the application of standard operating procedure for EIBF for all types of deliveries in health facilities is vital to support the successful implementation of EIBF.

ABSTRAK

Latar belakang: *Inisiasi Menyusui Dini (IMD) sangat menentukan keberhasilan pemberian asi ekslusif dan memegang peranan penting tidak hanya untuk menurunkan kematian neonatus terkait infeksi tetapi juga untuk memberikan perlindungan pada periode kehidupan berikutnya.*

How to Cite: Sadarang, R. A. I., & Haerana, B. T. (2023). Predictors of early initiation of breastfeeding (EIBF) in Sulawesi island: a population-based study. *Jurnal Berkala Epidemiologi, 11(*2), 142-150.
https://dx.doi.org/10.20473/jbe.v11i2 2023. 142-150

Tujuan: *Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor prediktor terhadap praktik menyusui dini di Pulau Sulawesi.* ***Metode:*** *Penelian cross sectional berbasis populasi menggunakan data Indonesia Demographic and Health Surveys (IDHS) Tahun 2017 dilakukan pada wanita yang telah melahirkan anak hidup di 6 Provinsi di Pulau Sulawesi sebesar 1040. Analisis menggunakan regresi logitik bivariat dan multivariat dengan model prediktif untuk desain sampel kompleks, disesuaikan dengan perancu untuk menguji hubungan IMD dengan variabel independen.* ***Hasil:*** *Penelitian menunjukkan 50,58% wanita melakukan praktik IMD di Pulau Sulawesi. Secara signifikan faktor prediktor praktifk IMD secara berurutan yaitu kelahiran tunggal dengan nilai asosiasi tertinggi, yakni aOR: 11.35, 95%CI (0,00-0,07), faktor kontak kulit bayi dan ibu segera setelah persalinan dengan aOR: 3.05 kali, 95%CI (2,22–4,21), faktor persalinan secara normal dengan aOR: 2.94 kali, 95%CI (1,94–4,45) dan faktor persalinan yang didampingi keluarga dengan aOR: 1.68 kali, 95%CI (1,06–2,67) serta faktor paritas >1 dengan aOR: 1.52 kali, 95%CI (1,10–2,10).* ***Kesimpulan:*** *Kelahiran tunggal, kontak kulit, persalinan normal dan persalinan didampingi keluarga serta paritas >1 menjadi faktor prediktor praktik IMD. Pelaksanaan edukasi terkait urgensi pelaksanaan IMD kepada ibu hamil dan keluarga sebagai support system serta penerapan standar operasional prosedur IMD untuk semua jenis persalinan di fasilitas kesehatan menjadi penting untuk menyokong keberhasilan pelaksanaan IMD.*

INTRODUCTION

Neonatal is the most crucial period in the early stage of a newborn's life. The highest risk of death was identified in the first month of life with 17 cases per 1000 live births globally in 2019 (1). Early initiation of breastfeeding and exclusive breastfeeding play an important role not only to reduce neonatal mortality related to infection, but also to provide protection in the next period of life (2).

Early initiation of breastfeeding, less than one hour after delivery, is recommended by the World Health Organization because it can influence the breastfeeding duration, the success of exclusive breastfeeding, and reduce infant mortality. Previous research found that 22.30% of neonatal mortality could be prevented by breastfeeding within one hour after delivery and if it was performed within 24 hours after delivery, the percentage of preventable neonatal mortality would be 16%. In addition, a significant increase in the relative risk of neonatal mortality was identified with delay in breastfeeding the newborn (3,4).

Globally, according to the World Health Organization (2018), an estimated 78 million babies or three in five are not breastfed within the first hour of life. The percentages of early breastfeeding practices were quite varied. Breastfeeding rates within the first hour after birth are highest in Eastern and Southern Africa (65%) and lowest in East Asia and the Pacific (32%). A research in Indonesia found that the percentage of early breastfeeding practice was at 43% (5). This is in line with the results of a national survey which showed an increase in this practice from 29.30% in 2010 to 34.50% in 2013.

South Sulawesi, one of the six provinces on Sulawesi island, ranked second as the province with breastfeeding rates above national coverage (6). This condition does not occur naturally. Many factors influence the success of breastfeeding coverage, the main ones are the practice of early initiation of breastfeeding, the demographic characteristics of the mother, obstetric characteristics and family factors and the role of health services. Therefore, this study aims to identify predictive factors of the early initiation of breastfeeding (EIBF) practice on Sulawesi Island as a basis for determining the best intervention to maintain or increase the coverage of early breastfeeding practice.

METHODS

This study used data from the 2017 Indonesia Demographic and Health Surveys (IDHS), which

was a nationally representative survey. The used design was cross-sectional. IDHS used a two-stage stratified sampling design. IDHS data were collected through direct interviews with a structured questionnaire (7). This study used a questionnaire for women of reproductive age. Samples were the women who had given live births to children aged ≤ 2 years at the time of the survey of selected households in six provinces on Sulawesi Island (North Sulawesi, South-Sulawesi, Southeast Sulawesi, West Sulawesi, Gorontalo and Central Sulawesi Provinces) of 1,040 children born alive.

The dependent variable is the early initiation of breastfeeding (EIBF), based on the reports of women who practiced early breastfeeding to their newborns within one hour after giving birth. Variables are categorized into early initiation of breastfeeding (EIBF) or delayed initiation of breastfeeding (EIBF). Predictor variables were classified into mother's demographic factors (consisting of age at childbirth, education, work status and area of residence), father factors (consisting of husband's education, occupation and wealth index), child factors (consisting of parity, child's sex, birth weight and singleton birth), delivery factors (consisting of parity, child's sex, birth weight and singleton birth), and other health factors (including skin-to-skin contact practice and Antenatal Care (ANC) visit).

The used dataset was the children's recode dataset (IDKR71SV). The analysis in this study used Stata software; therefore, the data file used was IDKR71FL.DTA. The analysis was carried out in three stages:

1. The univariate analysis describes the characteristics of the dependent and independent variables.
2. Bivariate analysis determines the relation of the independent variables with the dependent variable of early initiation of breastfeeding (EIBF) practice and the selection of multivariate candidate variables.
3. Multivariate analysis is to determine the factors that most influence the EIBF practice.

The multivariate analysis was the multivariate logistic regression with a predictive factor model. The analysis used a weighting adjustment of the sample by dividing the sample weight by 1,000,000 and then normalizing it so that the sample size after weighting was the same as the sample size that was not given. The Odds Ratio expressed the constant effect of the predictor on the outcome at the 95% confidence interval.

This study used downloaded data after registering on the DHS website (https://dhsprogram.com). The procedure and questionnaire used in the 2017 DHS survey have been reviewed and approved by The Institutional Review Board (IRB) of ICF International with the FWA00000085 document number (8). The IRB in the survey country ensured that the survey complied with local laws and norms. The respondents' names and addresses were not included upon downloading the data. Therefore, no separate ethical approval was required for using the data in this study.

RESULTS

The result of the data analysis showed that the proportion of EIBF practices within an hour after giving birth by mothers on Sulawesi Island reached 50.58%. The frequency distribution of respondents' characteristics showed that, based on demographic factors, the more dominant categories were the age group of 19-35 years at 64.13%, not working mothers at 61.15%, graduating from junior high school at 47.60% for mother's education, and living in rural areas at 64.23%. Based on the husband factors, the more dominant categories were fathers who do not work at 51.83%, father's education as not finishing junior high school at 54.36%, and the high wealth index at 59.62%. Based on child factors, the more dominant categories were parity, which was more than one at 66.83%, male at 51.73%, average birth weight at 92.60%, and singleton birth at 99.23% (Table 1).

Based on childbirth factors, the more dominant categories were the standard delivery type at 83.04%, childbirth in health facilities at 73.85%, accompanied by health workers at 91.50%, and accompanied by family members at 88.08%. Based on health-related factors, the more dominant categories were not practicing skin-to-skin contact 53.08% and complete ANC examination at 61.92% (Table 1).

The analysis results of factors related to the practice of EIBF showed that three out of the 18 factors were identified to show statistically significant differences in proportions. The three factors were parity, type of delivery and skin-to-skin contact practice. The result of the bivariate analysis became the variable screening stage,

which would be continued in the multivariate analysis. Variables that had a p-value < 0.25 and or were substantially significant were retained in order to be included in the multivariate candidates (Table 2).

Table 1
Description of Research Variables

Variables	Frequency	
	n	%
Breastfeeding		
EIBF	526	50.58
DIBF	514	49.42
Mother's age at Childbirth		
< 19 years old	73	7.02
> 35 years old	300	28.85
19 – 35 years old	667	64.13
Mother's Working Status		
Working	404	38.85
Not Working	636	61.15
Mother's Education		
Did not Graduate Junior High School	545	52.40
Junior High School/Equal	495	47.60
Status of Residence		
Rural	668	64.23
Urban	372	35.77
Father's Occupation		
Not Working	539	51.83
Agriculture	27	2.60
Non-Agriculture	474	45.58
Father's Education		
Did not Graduate Junior High School	555	54.36
Junior High School/Equal	466	45.64
Wealth Index of Family		
High	620	59.62
Middle	162	15.58
Low	258	24.81
Child Factors		
Parity		
One	345	33.17
More than one	695	66.83
Sex of the Child		
Female	502	48.27
Male	538	51.73
Child's Size At Birth		
Underweight	77	7.40
Normal	963	92.60
Singleton Birth		
Multiple birth/twin	8	0.77
Singleton birth	1.032	99.23
Type of Delivery		
Cesarean	176	16.96
Normal	862	83.04
Place of Delivery		
Not health facility	272	26.15
Health facility	768	73.85
Health Worker Companion		
Not health worker	92	8.85
Health worker	948	91.15
Family Companion		
Unaccompanied	124	11.92
Accompanied	916	88.08
Skin-to-Skin Contact Practice		
No	552	53.08
Yes	488	46.92
ANC Visit		
Incomplete	396	38.08
Complete	644	61.92

The results of the multivariate analysis of factors related to the EIBF practice in the order of the highest association values to the lowest were singleton birth, skin-to-skin contact practice, normal delivery, delivery accompanied by family, and parity of more than one/newborn who was the second child or more. The singleton birth factor was the factor with the highest association value of aOR: 11.35, 95% CI (0.00-0.07), which means that mothers who experienced singleton pregnancies had a probability to practice EIBF 11.35 times higher than mothers who experienced twin pregnancies. The skin contact factor between the newborns and the mothers immediately after delivery had the chance to induce EIBF practice 3.05 times, 95% CI (2.22–4.21) compared to newborns who did not have direct skin contact with their mothers. The normal delivery factor had the chance to induce EIBF practice 2.94 times, 95% CI (1.94–4.45) compared to cesarean delivery. The childbirth accompanied by family factor had the chance to induce EIBF practice 1.68 times, 95% CI (1.06–2.67) compared to without husband's companion. Parity factor >1 had the chance to induce EIBF practice 1.52 times, 95% CI (1.10–2.10) compared to the twin birth (Table 3).

Table 2
The Relation of Predictor Variables to EIBF

Predictors	Early initiation of breastfeeding (EIBF)		Delayed breastfeeding initiation (DIBF)		P value
	n	%	n	%	
Mother's Age					
< 19 years old	28	38.36%	45	61.64%	0.08
> 35 years old	158	52.67%	142	47.33%	
19-35 years old	340	50.97%	327	49.03%	
Mother's working					
Working	197	48.76%	207	51.24%	0.35
Not working	329	51.73%	307	48.27%	
Mother Education					
< Junior High School	288	52.84%	257	47.16%	0.12
Junior High School	238	48.08%	257	51.92%	
Status of Residence					
Rural	347	51.95%	321	48.05%	0.24
Urban	179	48.12%	193	51.88%	
Father's Occupation					
Not working	283	52.50%	256	47.50%	0.43
Agriculture	13	48.15%	14	51.85%	
Non-agriculture	230	48.52%	244	51.48%	
Father Education					
< Junior High School	279	50.27%	276	49.73%	0.90
Junior High School	236	50.64%	230	49.36%	
Wealth Index					
High	321	51.77%	299	48.23%	0.39
Middle	84	51.58%	78	48.15%	
Low	121	46.90%	137	53.10%	
Parity					
One	151	43.77%	194	56.23%	< 0.01
More than one	375	53.96%	320	46.04%	
Sex of the child					
Female	257	51.20%	245	48.80%	0.70
Male	269	50.00%	269	50.00%	
Child's Size at Birth					
Underweight	42	54.55%	35	45.45%	0.14
Normal	484	50.26%	479	49.74%	
Singleton Birth					
Multiple birth/ twin	2	25.00%	6	75.00%	0.04
Singleton birth	524	50.78%	508	49.22%	
Type of Delivery					
Cesarean	42	23.86%	134	76.14%	< 0.01
Normal	483	56.03%	379	43.97%	
Place of Delivery					
Not health facility	150	55.15%	122	44.85%	0.08
Health facility	376	48.96%	392	51.04%	
Health Worker					
Not health worker	43	46.74%	49	53.26%	0.44
Health worker	483	50.95%	465	49.05%	

(Continue)

Table 2
Continued

Predictors	Early initiation of breastfeeding (EIBF)		Delayed breastfeeding initiation (DIBF)		P value
	n	%	n	%	
Family Companion					
Unaccompanied	56	45.16%	68	54.84%	0.19
Accompanied	470	51.31%	446	48.69%	
Skin-to-skin contact					
No	195	35.33%	357	64.47%	< 0.01
Yes	331	67.83%	157	32.17%	
ANC Visit					
Incomplete	203	51.26%	193	48.74%	0.73
Complete	323	50.16%	321	49.84%	

Table 3
Predictors of Early Initiation of Breastfeeding (EIBF)

EIBF Predictor	aOR	P value	95%CI
Parity	1.52	0.01	1.10 – 2.10
Type of delivery	2.94	<0.01	1.94 – 4.45
Husband companion	1.68	0.02	1.06 – 2.67
Skin-to-skin contact practice	3.05	<0.01	2.22 – 4.21
Singleton birth	11.35	0.01	0.00 – 0.07

DISCUSSION

About 50.50% of mothers on Sulawesi Island breastfed within one hour after giving birth. This figure was above the national percentage of early breastfeeding, 34.50% in 2013. On the other hand, the average first breastfeeding time in Indonesia was 17,8 hours after giving birth. Compared to other countries in Southeast Asia, this condition was better compared to Pakistan but not better than Timor-Leste (9). Parity was one of the five predictive factors for early breastfeeding on Sulawesi Island. Statistical calculation showed that the probability of providing early breastfeeding was 1,52 times higher for mothers with previous childbirth experience than mothers who gave birth for the first time. A study conducted in East Java found that mothers without childbirth experience were 7,2 times more likely to delay breastfeeding than mothers with previous experience (10). This result is also supported by the results of previous studies (11–13).

Mothers without childbirth experience had the potential to face the following conditions that contributed to delaying early breastfeeding. First, delivery pain turned into long-term anxiety and stress during the puerperium. This condition could increase cortisol, suppressing the release of oxytocin, interfering with the let-down reflex, and delaying milk production (10). Second, preceding breastfeeding knowledge and experience were also related to the desire and success of early breastfeeding (11,14).

The contribution of the type of delivery variable as a predictive factor for early breastfeeding for mothers on Sulawesi Island was statistically significant in this study. Mothers with vaginal or standard delivery had a higher probability of up to 2,94 times for early breastfeeding than mothers with cesarean delivery. These results align with previous studies in Turkey, Malawi, Tanzania, Brazil, and Malaysia (14–18).

Cesarean delivery could be a constraining factor in initiating early breastfeeding due to postoperative conditions, such as significant pain and discomfort in carrying and positioning the baby due to limited mobility. This made mothers require help to position the newborn correctly and appropriately so that they could practice breastfeeding early (19). Also, newborns born by cesarean section were more prone to experience respiratory problems, making them more likely to be taken to the intensive care unit and physically separated from their mothers (17,20).

Furthermore, the operational procedure for early breastfeeding upheld in health facilities/birth centers has yet to apply to all types of deliveries. One study found that the procedure only applies to vaginal delivery (21). Generally, most cesarean deliveries are emergency cases, so early

breastfeeding after delivery is impossible. Aside from that, the presence of a pediatrician in the operating room and the involvement of other health workers, such as the operator and anesthesiologist's approval, which could not be fulfilled, also played a role as an obstacle to implementing early breastfeeding practice.

Family support involving early breastfeeding practice is requisite. In this study, the probability of practicing early breastfeeding was directly proportional to family support, especially by the husband who understands the importance of EIBF and exclusive breastfeeding. Support from family could be emotional support like praising and motivating to keep providing breastmilk up to six months, emotional support like informing the mother to give only breastmilk in the first six months without any additional food or drink, instrumental support like giving adequate resting time between breastfeeding time, and appraisal support like guide mother to provide breastmilk during her work. Another study found that family support also affected exclusive breastfeeding because the success of exclusive breastfeeding was influenced by the success of early breastfeeding (22–25).

During early breastfeeding, skin-to-skin contact between mother and newborn occurs. This practice is associated with successful early breastfeeding (26). The baby's hand movement over the mother's breast during skin contact can increase the secretion of oxytocin, which increases milk secretion. The sucking and touching of the baby's lips on the mother's breast and eye contact looking at the baby are significant stimuli for the hormones in the mother's brain to process milk production. The possibility of early breastfeeding can be increased by 3.05 times if the mother makes skin contact with the baby. This also occurs in mothers with cesarean delivery (18).

The newborns who make skin-to-skin contact with their mothers start breastfeeding on an average of 2.41 minutes after birth, while the duration of early breastfeeding by mothers who make skin-to-skin contact is 23 minutes. The American College of Nurse-Midwives stated that skin-to-skin contact helps babies smell and recognize the nipple so that the baby can start feeding more quickly. This condition is also associated with high levels of catecholamines immediately after birth, which makes the baby's nose's olfactory very sensitive to smell (27).

Singleton birth was identified as a predictive factor for this study's successful implementation of EIBF. The probability of implementing EIBF by mothers with singleton births was 11.35 times higher than by mothers with multiple births/twins. This has also been identified in Malawi (16) and Japan (28).

The contribution of the type of birth to the implementation of EIBF may be based on the mother's physical and mental condition and readiness. Compared to singleton births, multiple births/twins require higher physical and mental readiness, which may impact the timing of first breastfeeding/EIBF. The condition of the baby itself can also have an effect. For example, in twin/ multiple deliveries where babies are found to be born with low weight/ breathing problems/other newborn emergencies that cause the baby to have basic emergency measures in the early minutes of birth, this will affect the practice of EIBF.

Various studies have revealed the association between EIBF implementation on the success of exclusive breastfeeding (5,28). A reduction in the duration of breastfeeding up to 2.53 months was identified in mothers who experienced multiple births/twins compared to mothers who experienced singleton births. Mothers with multiple/twin pregnancies have difficulty continuing to breastfeed because twins require more time, which, in turn, may cause fatigue for the mother and sometimes cause insufficient milk supply to breastfeed twins.

CONCLUSION

Singleton birth, skin contact, standard delivery, and delivery accompanied by family and parity >1 were predictive factors of EIBF practice. The implementation of EIBF can provide benefits not only for the baby's health but also for the health of the mother, but the success of its implementation is strongly influenced by various factors, as identified in this study. The fulfillment of education related to the urgency of implementing EIBF to pregnant women and their families as a support system and the application of standard operating procedures for EIBF for all types of deliveries in health facilities is essential to support the successful implementation of EIBF.

CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

AUTHOR CONTRIBUTIONS

The authors confirm their contribution to the paper: RAIS: Writing and initial draft preparation, reviewing, and editing. BTH: Conceptualization, methodology, and data curation. All authors reviewed the results and approved the final version of the manuscript.

ACKNOWLEDGMENTS

None.

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