Original Article

Timely initiation of breastfeeding is associated with the practice of exclusive breastfeeding in Indonesia

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Background and Objectives: Exclusive breastfeeding has been proven to be essential for optimal health, and for reducing infections and mortality in children. However, exclusive breastfeeding coverage both in Indonesia and in globalremains low. This study evaluated the relationship between the timely initiation of breastfeeding and the practice of exclusive breastfeeding in Indonesia. **Methods and Study Design:** This cross-sectional study used Riskesdas 2013 data. Participants were 7,667 mothers whose children were aged 6–23 months in Indonesia, and were selected based on the completeness of the variables. The data were analysed using descriptive statistics, chi-square tests, and a multiple logistic regression that considered the sampling weight. STATA 13.0 was used for the analyses, and the significance level was set at $p<0.05$. **Results:** Timely initiation of breastfeeding within 1 hour of parturition (OR=3.66, 95% CI: 2.14–3.64), timely initiation of breastfeeding at or after 1 hour following parturition (OR=2.79, 95% CI: 3.00–4.46), and neonatal illness (OR=0.69, 95% CI: 0.53–0.91) were significantly associated with an exclusive breastfeeding history among children aged 6–23 months. Other factors, such as the mother's age, mother's educational level, child's birth weight, household economic status, and residential area were not associated with an exclusive breastfeeding history. **Conclusion:** Timely initiation of breastfeeding and the prevention of neonatal illness should be the main interventions to improve exclusive breastfeeding coverage in Indonesia.

Key Words: exclusive breastfeeding, breastfeeding initiation, neonatal illness

INTRODUCTION

Exclusive breastfeeding involves providing only breast milk to infants and not any food or liquid, including water, except for medicines and vitamin or mineral drops.[1] Exclusive breastfeeding affects child survival and overall development,[2] because breast milk limits morbidity and mortality through the reduction of infectious diseases.[3,4] In addition, breastfeeding can improve cognitive development in children and protect them from the risk of cardiovascular diseases.[5,6] A recent study also showed that breastfeeding may act as a modifiable factor related to child linear growth in low-birth-weight infants and those with poor economic status, although only slightly.[7]

Globally, exclusive breastfeeding coverage was 36% in 2011.[8] According to Riskesdas (2013), the exclusive breastfeeding coverage in Indonesia was 30.2%,[9] which remains far from the global target of the World Health Assembly (i.e., at least 50% by 2025).[10] To improve the achievement of exclusive breastfeeding for 6-month-old infants, the WHO and UNICEF issued a list of recommendations, one of which is the initiation of breastfeeding within the first hour of life.[11]

Previous studies have indicated that several factors, including the residential area, ethnicity, maternal employment, maternal education, maternal smoking status, parity, husband support, and maternal age are associated with exclusive breastfeeding[12,13] However, a comprehensive understanding of the relationship between substainability of exclusive breast feeding up to 6 months and timely initiation of breastfeeding is required.[14] No national-level study has addressed the association between the initiation of breastfeeding and exclusive breastfeeding in Indonesia. Therefore, this study evaluated the relationship between these concepts, using data from Riskesdas (2013).

MATERIALS AND METHODS

An observational, analytic, cross-sectional design was used to examine data from Riskesdas (2013) in this study. Riskesdas is a community-based survey that conducted every three years to collect health data in Indonesia. These data cover 33 provinces and 497 districts or cities in Indonesia. The survey was done in 2013 and was analyzed in 2015, however it is still relevant with current issues on the practice of breastfeeding. The sample population was all households with children aged 6–23 months in Indonesia, and the participants were all women whose

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children were aged 6–23 months and were part of the Riskesdas data. The participants with incomplete main variables (namely, exclusive breastfeeding, timely initiation of breastfeeding, birth weight, and neonatal illness) were excluded.

Herein, the definition of exclusive breastfeeding was based on the WHO definition.[1] This variable was based on the following questions: *"Did your child ever receive breast milk?"*, *"Before receiving breast milk, did your child consume any food or liquid other than breast milk?"*, and *"How old was your child when he/she receive the first food or liquid other than breast milk?"*. Moreover, timely initiation of breastfeeding was categorised as 'timely initiation within 1 hour of parturition', 'timely initiation at or after 1 hour following parturition', and 'no initiation'. Neonatal illness was defined as any illness that occurred during the first 28 days postpartum. The mother's education was categorised as high if the mother had a minimum education of senior high school. The mother's age was considered a risk if her age was less than 20 years or more than 35 years. Finally, household economic status was calculated based on the wealth index and categorised as very rich, rich, average, poor, and very poor.

The statistical analyses used in this study were descriptive statistics, chi-square tests, and multiple logistic regression, set at a significance of $p<0.05$. To correct the standard error in a complex survey design, sampling weight was also considered. The final model of logistic regression was determined through a stepwise backward selection. All statistical analyses were performed using STATA 13.0 (Stata Corporation, College Station, TX).

RESULTS

Based on the completeness of the main variables, a total of 7,667 mothers whose children were aged 6–23 months were included in this study. A list of the distribution of participant characteristics and the main variables is presented in Table 1. Most mothers (81.8%) were older than 25 years and 48.38% of them had completed senior high school. Regarding the household economic status, the majority (72.4%) were categorised as average or higher. The participants also primarilylived in urban areas (53.9%), and were mostly from Java and Bali (35.4%) and Sumatera (30.7%).

As shown in Table 1, only 25.6% of subjects exclusively breastfed. The history of low birth weight was 6.0% among subjects. More than half of the subjects (54.7%) initiated timely breastfeeding within the first hour of parturition. In addition, most subjects (89.0%) did not have children any neonatal illness.

The bivariate analysis, detailed in Table 2, revealed that timely initiation of breastfeeding was positively associated with exclusive breastfeeding (OR=2.68, 95% CI: 2.23–3.22 for initiation at or after 1 hour following parturition, and OR=3.43, 95% CI: 2.99–3.92 for initiation within 1 hour of parturition). In addition, other variables related to exclusive breastfeeding included normal birth weight and the absence of neonatal illness.

Multivariate analysis was also performed following bivariate analysis. All variables with $p<0.25$ in the bivariate analysis, such as timely initiation of breastfeeding, birth weight, neonatal illness, mother's education, mother's occupation, and residential area, were included in multiple logistic regression.

Table 1. Distribution of subject characteristics and main variables

Variables	n	%
Subject characteristics		
Mother's age (years)		
<20	208	2.7
20–24	1175	15.5
25–29	2016	26.6
30–34	2267	29.9
≥35	1925	25.4
Mother's education		
No formal education	93	1.2
Incompleted elementary school	409	5.4
Completed elementary school	1702	22.4
Completed junior high school	1715	22.6
Completed senior high school	2649	34.9
Completed college	492	6.5
Completed bachelor	531	7.0
Mother's occupation		
Private or government employee/ army/police/ entrepreneurship	1550	20.4
Farmer/breeder/labor/others	1167	15.4
Not working	4874	64.2
Household economic status		
Very poor	855	11.2
Poor	1259	16.4
Average	1659	21.6
Rich	1915	24.9
Very rich	1979	25.8
Living area		
Urban	4139	53.9
Rural	3528	46.0
Province		
Sumatera	2357	30.7
Java and Bali	2711	35.4
Kalimantan	833	10.9
Sulawesi	943	12.3
Eastern Indonesia	823	10.7
Main variables		
Exclusive breastfeeding		
No	5704	74.4
Yes	1963	25.6
Birth weight		
Normal (≥2500 g)	7204	93.9
Low birth weight (<2500 g)	463	6.0
Timely initiation of breastfeeding		
No initiation	2480	32.4
Initiation <1 hour	993	12.9
Initiation ≥1 hour	4194	54.7
Neonatal illness		
No	6825	89.0
Yes	842	10.9

Table 3 outlines the results of the final model after stepwise backward elimination was used in multiple logistic regression. Subsequent to this additional evaluation, the only variables significantly associated with exclusive breastfeeding were timely initiation of breastfeeding and neonatal illness. Specifically, mothers who timely initiated breastfeeding within the first hour of parturition had a 3.66 higher likelihood of exclusive breastfeeding than mothers who did not initiate breastfeeding at all For those who initiated breastfeeding at or after 1 hour following parturition, the likelihood that they practised exclusive

Table 2. Bivariate analysis of factors associated with exclusive breastfeeding

Variables	Exclusive breastfeeding				OR	*p* value	95% CI
	Yes		No				
	n	%	n	%			
Timely initiation of breastfeeding							
Initiation <1 hour	1378	32.9	2816	67.1	3.43	<0.0001*	2.99–3.92
Initiation ≥1 hour	275	27.7	718	72.3	2.68	<0.0001*	2.23–3.22
No initiation	310	12.5	2170	87.5	1		
Birth weight							
<2500 g	84	18.1	379	81.9	1		
>2500 g	1879	26.1	5325	73.9	1.59	<0.0001*	1.25–2.03
Neonatal illness							
Yes	174	20.7	668	79.3	1		
No	1798	26.2	5036	73.8	1.36	<0.0001*	1.15–1.63
Mother's age							
At risk	556	26.1	1577	73.9	1.03	0.60	0.92–1.16
Not at risk	1391	25.5	4067	74.5	1		
Mother's education							
High	935	25.5	2737	74.5	1		
Low	1102	25.8	2907	74.2	1.11	0.045*	1.00–1.23
Mother's occupation							
Private or government employee/army/ police/entrepreneurship	370	23.9	1180	76.1	1		
Farmer/breeder/labor/others	303	25.9	864	74.0	1.12	0.21*	0.94–1.33
Not working	1274	26.1	3600	73.9	1.12	0.08*	0.99–1.29
Household economic status							
Very poor	240	28.1	615	71.9	1.09	0.31	0.92–1.31
Poor	350	27.8	909	72.2	1.07	0.39	0.92–1.26
Average	399	24.1	1260	75.9	0.88	0.10*	0.76–1.03
Rich	451	23.6	1464	76.5	0.86	0.04*	0.74–0.99
Very rich	523	26.4	1456	73.6	1		
Living area							
Urban	1016	24.6	3123	75.5	1		
Rural	947	26.8	2581	73.2	1.13	0.02*	1.02–1.25
Province and living area							
Java and Bali. urban	394	22.8	1336	77.2	1		
Java and Bali. rural	236	24.1	745	75.9	1.07	0.45	0.89–1.29
Sumatera. urban	271	22.8	919	77.2	0.99	0.99	0.83–1.19
Sumatera. rural	298	25.5	869	74.5	1.16	0.09*	0.98–1.38
Kalimantan. urban	108	26.3	302	73.7	1.21	0.13*	0.95–1.55
Kalimantan. rural	99	23.4	324	76.6	1.04	0.78	0.81–1.33
Sulawesi. urban	94	23.2	312	76.9	1.02	0.87	0.79–1.32
Sulawesi. rural	150	27.9	387	72.1	1.31	0.01*	1.06–1.64
Eastern Indonesia. urban	149	36.9	254	63.0	1.99	<0.0001*	1.58–2.51
Eastern Indonesia. rural	164	39.1	256	60.9	2.17	<0.0001*	1.73–2.72

*Level of significance 0.25 for bivariate analysis.

Table 3. Final model of multivariate analysis

Variables	OR	*p* value	95% CI
Timely initiation of breastfeeding			
Initiation <1 hour	3.66	<0.0001	2.14–3.64
Initiation ≥1 hour	2.79	<0.0001	3.00–4.46
No initiation	1		
Neonatal illness			
Yes	0.69	0.01	0.53–0.91
No	1		

breastfeeding was 2.79 times higher than mothers who did not initiate breastfeeding at all. By contrast, the history of neonatal illness in their children was a protective factor against exclusive breastfeeding. Mothers whose children had any neonatal illness within the first 28 days postpartum had a 1.45 higher likelihood of not practising exclusive breastfeeding.

DISCUSSION

Timely initiation of breastfeeding, both within the first hour after parturition and at or after 1 hour following parturition, was significantly related to exclusive breastfeeding. This result is consistent with that of a previous study, which demonstrated that the absence of timely initiation of breastfeeding within 1 hour of parturition was related to a failure to exclusively breastfeed.[15] The risk was also higher when breastfeeding was initiated 48 hours postpartum.[16]

Timely initiation of breastfeeding can increase the likelihood of practising exclusive breastfeeding, which may be attributable to the psychological factors of mothers who initiated breastfeeding for their children. For example, infants who received timelybreastfeeding initiation were also determined to have received family support, and have mothers who were adequately knowledgeable and had received counselling about breastfeeding. These observations indicate that mothers who successfully initiated breastfeeding believed that they could produce more breast milk and could practise exclusive breastfeeding for their children.[17]

Late initiation of breastfeeding was also associated with giving prelacteal food. The time interval after parturition and late breastfeeding initiation may increase the likelihood that infants receive prelacteal food.[18] Prelacteal food remains a challenge in the practice of exclusive breastfeeding because it can disturb the frequency of breastfeeding and thus lead to the failure of practising exclusive breastfeeding.

Illness during the neonatal period or within the first 28 days of life was significantly negatively associated with exclusive breastfeeding; in short, infants with any neonatal illness were less likely to receive exclusive breastfeeding. One previous study determined that infant morbidity was the most significant predictor of exclusive breastfeeding.[19] Conditions such as dehydration, hypoglycaemia, neonatal jaundice, and gastrointestinal disturbance may be the reasons why health workers introduce prelacteal food to infants.[20]

In some cases, breastfeeding was ceased when children got illness and fever since breast milk was perceived to be the source of fever.[21] Other research indicated that giving formula milk and a pacifier to infants in hospitals was associated with early breastfeeding weaning. Mothers whose infants received formula milk because of medical conditions tended to stop breastfeeding; in addition, infants who used pacifiers had a lower suckling reflex. This may lead to the inability of infants to adequately suck breast milk from the mother, thus lowering breast milk production and leading to the failure of exclusive breastfeeding.[22]

In our bivariate analysis, low birth weight was significantly related to exclusive breastfeeding. However, after reviewing the birth weight variable through the multivariate analysis, the relationship was rendered nonsignificant. One prior study revealed that low birth weight was associated with exclusive breastfeeding when low-birth-weight infants were hospitalised in the neonatal intensive care unit (NICU). These infants had specific medical conditions that required their admittance to the NICU, and thus they had a higher likelihood of receiving any food in addition to breast milk.[23] Exclusive breastfeeding failure primarily occurs in very-low-birth-weight (i.e., less than 1500 g) babies treated in the NICU.[24] These findings indicate that low-birth-weight infants have a higher likelihood of receiving exclusive breastfeeding only if they do not have any medical complications or are not being treated in the NICU.

The mother's education was not significantly related to exclusive breastfeeding; this is consistent with one previous study that also found no significant association between these variables.[25] The mother's knowledge about breastfeeding plays a crucial role in the success of exclusive breastfeeding practice; however, a high level of education does not always reflect favourable knowledge, particularly knowledge about breastfeeding. Mothers with limited knowledge about breastfeeding often have incorrect perceptions about breast milk production and prelacteal practices.[26,27] Moreover, high maternal knowledge for breastfeeding is the only factor related to a longer duration of exclusive breastfeeding.[28]

Finally, in addition to birth weight and the mother's education, residential area was also not significantly related to exclusive breastfeeding in the multivariate analysis. Our result is consistent with that of Engebretsen, who similarly noted that neither rural nor urban residence was related to exclusive breastfeeding.[25]

Strengths and limitations

A large-scale dataset representing participants from all provinces in Indonesia was used in this study. This substantial dataset may provide adequate information to assess the relationship between the variables. The definition of exclusive breastfeeding was based on not only the 24-hour recall indicator of exclusive breastfeeding in the Riskesdas questionnaire, but also the WHO definition that combines several variables (e.g., breastfeeding status, time of the introduction of complementary food, and prelacteal food status). In the present analysis, sampling weight was also considered to adjust the standard error in a complex survey design.

However, this study also has some limitations. Information on the exclusive breastfeeding variable was obtained from respondents whose children were aged 6–23 months at the time of interview, potentially leading to recall bias. Moreover, the cross-sectional design of this study inhibits knowledge of the potential causal–effect relationships between the variables. In addition, the data were secondary data with several missing values for the variables used in this study, and the participants with incomplete data were excluded. Despite losing several participants because of this problem, the proportion of participants representing each province and residential area remained in accordance with the necessary proportion of participants for evaluation.

Conclusion

Several factors, such as timely initiation of breastfeeding (both within the first hour of parturition and at or after 1 hour following parturition) and neonatal illness are significantly associated with exclusive breastfeeding. Children who receive early breastfeeding initiation have a higher likelihood of being exclusively breastfed. By contrast, children who are ill within the first 28 days of life or during the neonatal period are less likely to receive exclusive breastfeeding.

Effort is required to improve the practice of exclusive breastfeeding by increasing the timely initiation of breastfeeding within 1 hour of parturition. This can be done through sufficient education and counselling provided by health workers. These strategies should include a discussion about the benefits of exclusive breastfeeding, a demonstration of the correct procedure for breastfeeding, and a discussion about the suitable diet for lactating mothers. Therefore, further study is needed to provide evidences on the pathway explaining the association between timely initiation of breastfeeding and the practice of exclusive breastfeeding.

The prevention or proper treatment of neonatal illness is also required to improve the practice of exclusive breast-feeding. This can be achieved by enhancing the diet quality of pregnant mothers and ensuring regular antenatal care visits occur. Finally, hygiene and sanitation practices in maternal and child should be improved. In addition, health education may have to be provided for

lactating mothers to enhance their understanding about breastfeeding and child illness.

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AUTHOR DISCLOSURES

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