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Young children nutritional status in Samarinda: does exclusive breastfeeding play a role in stunting prevention?

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Abstract

Purpose: This study aimed to investigate the relationship between exclusive breastfeeding and stunting incidence in young children aged 0-59 months. **Method:** This is an observational study with a cross-sectional approach. There were 100 mothers with young children aged 0-59 months as respondents from Palaran, Samarinda. The dependent variable was children's height-for-age nutritional status, as in normal or stunting, and the independent variable was exclusive breastfeeding. Young children's height was collected by checking their Maternal and Child Health (KIA) book. Parity, family income, mother's education, mother's knowledge, and family support information were also collected by interview. Bivariate analysis was measured with the Chi-square test. **Results**: There is no association between exclusive breastfeeding and stunting (p-value>0.05). We also found no association between stunting and parity, family income, mother's knowledge, and family support (p-value<0.05). However, we found a significant relationship between stunting and mother education. **Conclusion:** Exclusive breastfeeding is not associated with stunting in Palaran, Samarinda. Further research is needed to determine the factors associated with stunting in Samarinda.

Keywords: stunting; exclusive breastfeeding; toddlers; mother's education

INTRODUCTION

Stunting is the impaired growth and development of children caused by chronic and recurrent malnutrition and is usually associated with poverty, poor nutritional status and maternal health, frequent infection, and/or poor social stimulation. *Stunting* is characterized by the length-to-age ratio below -2 standard deviations [1]. Stunting has short-term and long-term impacts on children, including the increased risk of morbidity and mortality, higher risk of decreasing development capacity and learning ability, higher risk of infection and communicable diseases as adults, and decreased productivity [2].

Globally, under-five child stunting decreased from 39.9% in 1990 and 21.9% in 2018, including in Indonesia [3]. Indonesia's National Basic Health Research showed a decrease in stunting prevalence from 37.2% in 2013 to 30.8% in 2018. Nevertheless, it is still far from the national target of 14% in 2024. In East Kalimantan, 29.2% of children were stunted [4], while in Palaran District, there was only 13.7%. Even though this prevalence has met the national target of 14%, stunting is still an important issue to be thoroughly resolved.

A proper strategy is needed to effectively support Indonesia's accelerated stunting reduction program. Exclusive breastfeeding was reported to be effective in supporting optimal growth in children under five and plays a protective role against stunting [5]. Although

some studies found that formula milk feeding can provide greater weight and length gain than breast milk, the increase is considered to occur too quickly and can cause babies to become overweight [6]. In addition, giving formula milk is also not recommended in areas with poor sanitation and a high risk of water sanitation [7]. Therefore, there is a need for more studies on exclusive breastfeeding in stunting prevention in remote areas or with limited resources. By conducting such studies, we can better understand the efficacy of exclusive breastfeeding and its potential to mitigate stunting in areas with limited access to resources.

The prevalence of exclusively breastfeeding mothers worldwide is still low, namely 41% and 37% in lower to middle-income countries [8]. The practice of exclusive breastfeeding in Indonesia, although widely practiced, has a prevalence of only 37.3% [4]. Breastfeeding is reported to be more common among the poor in Indonesia, but only a few provide it exclusively [9].

Other factors are thought to influence exclusive breastfeeding for young children. Family support, especially father/husband, significantly influenced the behavior and decision on exclusive breastfeeding [10]. Parity has been reported to influence exclusive breastfeeding, although the relationship is still inconclusive [11–13]. Several studies have reported a relationship between the level of education of mothers and fathers and exclusive breastfeeding [13, 14]. Mothers' knowledge about the benefits of exclusive breastfeeding influences the mother's decision to initiate early breastfeeding and provide exclusive breastfeeding [15].

Palaran is one of the districts in Samarinda City, East Kalimantan, which will support the *Ibu Kota Nusantara* starting in 2024. Qualified and productive human resources are needed to support Indonesia's more advanced development, strengthening the stunting reduction accelerated program by intensifying exclusive breastfeeding for young children. Therefore, it is necessary to study the relationship between stunting and exclusive breastfeeding, considering several other factors, namely parity, socioeconomic: parity education, mother's knowledge regarding the benefits of exclusive breastfeeding, and family support.

METHODS

The research design uses an observational study with a cross-sectional approach. The respondents to this study were mothers with toddlers aged 0-59 months and willing to be respondents. The total sample in this research was 100 respondents, and they lived in the work area of the Palaran Health Center, Palaran District, Samarinda, East Kalimantan. The sampling method uses PPS (probability proportional to size) by taking the size of the group or population into account, including Rawa Makmur Village (55 respondents), Handil Bakti Village (23 respondents), and Simpang Pasir Village (22 respondents). As for a brief description of the research site, it has an area of 128 km^2, inhabited by around 32,853 people consisting of 17,310 men and 15,543 women spread over three sub-districts. Palaran District is an industrial center engaged in the timber sector and its supporting industries. The livelihoods of the Palaran Health Center working area are mostly private workers (52.35%) and entrepreneurs or traders (31.3%). This research was conducted from October to November 2022.

The dependent variable in this study was the incidence of stunting in toddlers as measured by height and age data obtained from the Maternal and Child Health (KIA) handbook with a maximum duration of 2 months ago. These data were cross-checked with the existing data on Community Health Workers (CHWs) who routinely weighed toddlers every month. These toddlers were considered stunted if they had a length-for-age nutritional status of -2 SD on the Z-score. The independent variable in this study was exclusive breastfeeding, defined as toddlers receiving only breast milk from 0–6 months. Exclusive breastfeeding is based on the question, "Are toddlers given exclusive breastfeeding?" "What foods or drinks do the toddlers consume when they are 0–6 months old?" and "At what age (month) do the toddlers start getting food or drinks other than breast milk?".

Investigators also examined the effect of confounding variables on the study's results. These variables are parity, family income, the mother's education, knowledge of exclusive breastfeeding, and family support in providing exclusive breastfeeding. Data on the mother's knowledge and family support, parity, family income, and mother's education were from the interviews.

A univariate analysis was performed to describe the characteristics of each variable studied. Meanwhile, we performed bivariate analysis to examine the relationship between the percentage of mothers who provided exclusive breastfeeding and mothers who did not and the incidence of stunted. Bivariate analysis used the chi-square test. The Fisher's Exact Test is used if the expected value is less than 5. Logistic regression analysis aims to test whether the independent variable can predict the probability of occurrence of the dependent variable. This study also conducted a multivariate analysis using a logistic regression test. A logistic regression test was carried out to determine the effect of exclusive breastfeeding on the incidence of

stunting in toddlers in the work area of the Palaran Health Center, which includes three villages, and to analyze the impact of independent variables by considering confounding variables.

RESULTS

Table 1 shows the demographic characteristics of the respondents among 100 mothers in the Palaran District. As many as 30% of toddlers experienced stunting based on their nutritional status and body length/age, and 33% did not get exclusive breastfeeding. 71% of mothers had a higher education level. 60% were senior high school graduates, and 11% were college or university graduates. As many as 29% had an education level below senior high school. The majority of respondents did not work, or they were housewives. Nearly 50% of respondents had a family income below the minimum wage. In addition, most mothers had good knowledge about exclusive breastfeeding (83%), and their families well supported almost all respondents to provide exclusive breastfeeding (94%).

Table 2 shows that most toddlers received exclusive breastfeeding (67%), but as many as 23.9% were stunted. As many as 33% of toddlers did not get exclusive breastfeeding, and 42.4% were stunted. The analysis showed no significant relationship between exclusive breastfeeding and stunting (p-value > 0.05).

Table 1. Characteristics of respondents (n=100)

Variable		%
Toddlers nutritional status	Stunting	30.00
	Normal	70.00
Exclusive breastfeeding	No	33.00
	Yes	67.00
Parity	>2 births	40.00
	≤2 births	60.00
Mother's education	Elementary	7.00
	Junior high school	22.00
	Senior high school	60.00
	College graduates	11.00
Mother's job	Civil servant	3.00
	Private employees	4.00
	Entrepreneur	5.00
	Not working	88.00
Family income	< Regional minimum wage	42.00
	≥ Regional minimum wage	58.00
Mother knowledge	Not good	17.00
	Good	83.00
Family support	Not supported	6.00
	Supported	94.00

Regional Minimum wage East Kalimantan 2022, IDR 3,014,497.00

Table 2. Relationship between toddlers' nutritional status and exclusive breastfeeding, family income, mother education, parity, mother knowledge, and family support

Independent variable		Dependent variable: Toddlers nutritional status						OR (95% CI)	P-value
		Short		Normal		Total			
		n	%	n	%	n	%		
Exclusive breastfeeding	No	14	42.4	19	57.6	33	100	2.349 (0.965-5.719)	0.095
	Yes	16	23.9	51	76.1	67	100		
Family Income	<Region minimum wage	16	38.2	26	61.9	42	100	1.484 (0.640-3.442)	0.200
	≥Region minimum wage	14	24.1	44	75.9	58	100		
Mother Education	Low	14	48.3	15	51.7	29	100	1.681 (0.685-4.124)	0.021*
	High	16	22.5	55	77.5	71	100		
Parity	>2 births	11	27.5	29	72.5	40	100	1.162 (0.498-2.711)	0.824
	≤2 births	19	31.7	41	68.3	60	100		
Mother Knowledge	Not good	6	35.3	11	64.7	17	100	3.727 (1.267-10.962)	0.816
	Good	24	28.9	59	71.1	83	100		
Family Support	Not supported	2	33.3	4	66.7	6	100	1.016 (0.176-5.853)	1.000
	Supported	28	29.8	63	70.2	94	100		
Total		**33**	**33**	**67**	**67**	**100**	**100**		

* Significant relationship

Table 3 shows that a mother's education was related to the incidence of stunting. Other factors, including family income, parity, the mother's knowledge, and family support, were not related to the incidence of stunting.

Table 3. Multivariate modeling

Variable	Modeling number				
p-value for	**1**	**2**	**3**	**4**	**End**
Independent variable					
Exclusive breastfeeding	0.093	0.105	0.122	0.118	0.099
Confounding variable					
Parity	0,261	0,293	0,317	-*	-
Family income	0,254	0,241	0,258	0,221	-*
Mother's education	0,011	0,014	0,016	0,024	0,020
Mother's knowledge	0,451	0,596	-*	-	-
Family support	0,501	-*	-	-	-
OR – Exclusive breastfeeding	2,304	2,223	2,094	2,094	2,170
OR changes	-	3,51%	9,11%	9,11%	5,81%

Notes * = variable excluded from modeling.

Table 4 shows no significant relationship between exclusive breastfeeding and stunting. However, among children under five, not receiving exclusive breastfeeding increases the likelihood of stunting by 2.2 times, even after controlling for mother education.

Table 4. Multivariate test results

Variable	n	p-value	OR	95% CI
Exclusive breastfeeding		0.099	2.170	0.866 – 5.439
Yes	67	0.550	1.351	0.504 - 3.619
No	33	0.032	3.955	1.122 - 13.941
Mother's education		0.020	3.026	1.191 – 7.685

DISCUSSION

As many as 30% of toddlers were stunting, and 33% were not exclusively breastfed. This study found no significant relationship between exclusive breastfeeding and toddler stunting. We also found no relationship between family income, parity, mother's knowledge, family support, and stunting. There was a significant relationship between stunting and mother education.

Exclusive breastfeeding was a protective factor against stunting, mainly in low-income populations [5]. The immunity factor of breast milk can strengthen a child's immune system, thereby reducing the risk of recurrence of diarrhea and infectious diseases [16]. This study found no relationship between exclusive breastfeeding and stunting, in line with several studies in Indonesia [17, 18]. However, this result was different from studies in Pekanbaru [19], Mamasa [20], Bontang [21], and Surakarta [22].

Exclusive breastfeeding is not the only risk factor for stunting. Stunting can be caused by individual, household, and environmental factors. Infectious disease and recurrent diarrhea were the risk factors of stunting, but the risk decreases if the child is breastfed exclusively [23]. However, exclusive breastfeeding is not the only protective factor. Sanitation, availability of clean water, and adequate nutrition intake are also protective factors from recurrent infectious diseases and diarrhea [5, 18].

Our study did not find any relationship between family income and stunting. This result does not align with previous studies in Indonesia [18, 24]. Low family income increases the risk of stunting through non-nutritious food intake due to difficulty accessing high-quality food. They also have a higher risk of exposure to infectious diseases due to the difficulty in accessing clean water, the inability to live in a proper environment, and the lack of access to basic health facilities [23].

We found a relationship between the mother's education level and stunting, which aligns with previous studies [25, 26]. Several mechanisms might explain how a mother's education level can affect stunting. First, the mother's education affects the child's birth weight. In contrast, mothers with higher education tend to do antenatal care so that the growth and development of the fetus are better monitored. The second mechanism is through child feeding practices. Children of mothers with higher education will likely get adequate nutrition from breast milk and complementary foods in the first two years. Third, knowledge about diseases that children may suffer from in the first two years. Mothers with higher education may better understand diseases and are more likely to have better jobs and income, making it easier to access nutritious food and health facilities [27]. However, not-working status and a family income below the minimum wage may relate to a mother's ability to absorb information on feeding practices.

No parity and stunting relationship is in line with a study in Gorontalo [28]. Cases, where stunted children are born to mothers with low parity may be due to socioeconomic level. In the current study, 16 out of 30 mothers with stunted children have low economic levels; thus, mothers cannot fulfill the children's nutritional needs.

This study found no relationship between mothers' knowledge and stunting. This result is consistent with a study in Pekauman, Banjarmasin [29]. When the

mother's knowledge is in a good category, there will be appropriate applications or actions regarding exclusive breastfeeding and stunting prevention based on her knowledge. However, behavior is influenced by other factors, including socio-cultural, environmental, and socio-economic factors [30], so mothers' high knowledge does not always guarantee their children's nutritional status.

No significant relationship between family support stunting in this study is in line with a study in Padang [31]. The low mother's compliance may explain this to breastfeeding exclusively. Even though the family support in exclusive breastfeeding is high, if the mother's compliance does not match it, efforts to prevent stunting will not be optimal.

Although there have been some studies on exclusive breastfeeding and stunting, this research is unique in choosing the location. Palaran District is in a humid tropical forest area, further enhancing existing novelty and diversity. We use anthropometric data recorded in the Mother and Child Book (*Buku KIA*) and re-examined by community health workers.

CONCLUSION

Stunting is more common in toddlers under the supervision of mothers with lower levels of education than in toddlers under the supervision of mothers with higher levels of education. This study found no relationship between exclusive breastfeeding and the incidence of stunting in toddlers in Palaran District, Samarinda. Further research needs to look at other factors affecting stunting problems in toddlers besides those studied. One of the efforts to prevent stunting is to increase access to public education so that mothers can receive higher education, which can increase their insight and knowledge regarding proper childcare. Mothers can also gain increasing knowledge through counseling and outreach involving the Palaran Health Center. This step equips mothers to face pregnancy and caring for toddlers, especially in meeting the nutritional needs of toddlers.

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