

# Exclusive Breastfeeding And Acute Diarrhea In Children: A Cross-Sectional Study

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## Abstract

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**Introduction** : Breastmilk is known to contain molecules such as oligosaccharides, sIgA and lactoferrin which hold vital importance in immune system. These molecules specifically functioned to protect the body from pathogens including those causing diarrhea. The objective of this study is to define the relationship between exclusive breastfeeding and acute diarrhea incidence frequency in children as primary outcome and age of first acute diarrhea occurrence in children as secondary outcome.

**Methods**: This is an analytic observational cross-sectional study which included 35 children aged 6-24 months who were admitted to Kaswari Ward Wangaya General Hospital Denpasar between 01 June 2018 to 16 August 2018. Samples were obtained through consecutive sampling method and analyzed data were presented in both tables and narrative.

**Results**: From 35 samples included in this study, 13 were exclusively breastfed (37,1%) and 22 were non-exclusively breastfed (62,9%). Sample characteristics including gender, number of siblings, nutritional status, residence, source of water, age of mother, parent's occupation and education were comparable between two groups. Total samples who were exclusively breastfed and experience less diarrhea is 13 ( $p = 0,031$ ;  $PR = 1,47$  CI 95% 1,10-1,95). Total samples who were exclusively breastfed and first age of experiencing diarrhea over 12 months old is 11 ( $p = 0,002$  ;  $PR = 3,10$  CI 95% 1,47-6,27).

**Conclusion**: There is statistically significant relationship between exclusive breastfeeding and acute diarrhea incidence frequency and age of first acute diarrhea occurrence in children aged 6-24 months in Kaswari Ward Wangaya General Hospital.

## Introduction

Diarrhea is still a major health burden as it is the leading cause of mortality and morbidity in children under 5. Diarrhea is responsible for approximately 6 million deaths of children every year mainly occurred in developing countries such as Indonesia. Of all number of deaths in children aged 29 days to 11 months in Indonesia, 34% caused by diarrhea.

According to data from Indonesian Ministry of Health, there is an increase in the incidence of diarrhea cases nationally from 2016, namely 6.897.463 cases to

7.077.299 cases in 2017. Toddlers are the most susceptible group due to immature immune system and life dependency to parents. An estimated 33,2% of diarrhea cases occur in children under age of 4 and half occur in infants under 12 months old.<sup>1-6</sup>

Breastmilk is long known as the most ideal source of nutrition for babies. It enhances immune system and optimize response to vaccination through the work of oligosaccharides, sIgA and lactoferrin. The World Health Organization recommend exclusive breastfeeding for the first 6

months of life. Based on the data from Indonesian Ministry of Health in 2017, exclusively breastfed babies in Indonesia only comprises 35,73% of the population and still far below the national target of 80%. This can have an impact on increasing rate of infections such as diarrhea, otitis media, neonatal sepsis, necrotizing colitis, urinary tract infection and lower respiratory tract infection. Considering the low number of exclusive breastfed children and increasing cases of acute diarrhea in Indonesia, this study aims to define the relationship between exclusive breastfeeding and acute diarrhea by analyzing the incidence frequency and age of first acute diarrhea occurrence.<sup>4,7-10</sup>

## Methods

### *Study Population and Design*

During the period from 01 June 2018 to 16 August 2018, this cross-sectional study was carried out at the Kaswari Ward, Wangaya General Hospital, Bali, Indonesia. Samples were obtained with consecutive sampling method.

All 6-24 months children, male or female with parental consent were included in the study. Exclusion criteria consist of immunocompromised children, children whose mothers have HIV infection, children with congenital anomalies, children diagnosed with cow's milk allergy

or lactose intolerance, children on iron supplementation, children consuming laxatives, children with overuse of antibiotics and children immunized with rotavirus vaccine. With regard of 5%  $\alpha$ , minimum samples of 31 were calculated.

### *Statistical Methods*

Data were analyzed using standard computer program SPSS Windows version 20. (SPSS Corporation, USA). Continuous data were expressed in the form of the mean  $\pm$  SD. Categorical data were expressed as numbers and percentage. For comparison of categorical data, we used chi-square test and exact Fischer test. The risk of acute diarrhea incidence in exclusively breastfed children were expressed with prevalence ratio with confidence interval of 95%. P value of < 0,05 indicates significant results.

## Results

Over the period of 01 June 2018 to 16 August 2018, there are 162 patients admitted to Kaswari Ward, Wangaya General Hospital. Only 51 patients were between the age of 6-24 months and 35 met inclusion and exclusion criteria. From 16 patients who were excluded, 10 with congenital anomalies, 5 diagnosed with cow's milk allergy and 1 was vaccinated with Rotavirus. The demographic data of the samples are shown in table (1).

Table 1. Demographic data of the samples

Characteristics	Exclusively breastfed (n=13)	Non-exclusively breastfed (n=22)
Age, month (SD)	15,2 (1,5)	12,5 (1,3)
Gender		
Male, n	7	12
Female, n	6	10
Siblings		
None, n	6	10
One or more, n	7	12
Nutritional status		
Normal, n	12	20
Abnormal, n	1	2
Place of living		
Urban, n	13	20
Suburb, n	0	2
Water resources		
Filtered water, n	3	6
Ground water, n	10	16
Maternal age		
Under 30 years old, n	9	17
Over 30 years old, n	4	5
Maternal occupation		
None, n	9	10

Working mother, n	4	12
Paternal occupation		
Working class, n	9	17
Entrepreneur, n	4	5
Maternal education		
Primary education, n	4	13
Secondary education, n	9	9
Paternal education		
Primary education, n	4	4
Secondary education, n	9	18

The primary outcome of this study is to define the relationship between exclusive

breastfeeding and acute diarrhea incidence which shown in table (2).

Table 2

Variables	Acute Diarrhea Incidence Frequency		PR (CI 95%)	p
	Infrequent (<2x)	Frequent (≥2x)		
Exclusively breastfed, n	13	0	1,47 (1,10-1,95)	0,031*
Non-exclusively breastfed, n	15	7		

\* Chi-square

The secondary outcome of this study is to define the relationship between exclusive

breastfeeding and age of first acute diarrhea occurrence which shown in table (3).

Table 3

Variables	Age of first acute diarrhea occurrence		PR (CI 95%)	p
	Older than 12 months old	0-12 months old		
Exclusively breastfed, n	11	2	3,10 (1,51-6,38)	0,002*
Non-exclusively breastfed, n	6	16		

\* Fischer exact test

**Discussion**

From all of the patients experiencing less than twice acute diarrhea episodes, 46,4% were exclusively breastfed and 53,6% were not. There was one cell with zero actual count and the expected numbers were more than 20%. Therefore, Fischer exact test were employed with p-value of 0,031 (two-way analysis). Null hypothesis was rejected which mean there is statistically significant relationship between exclusive breastfeeding with acute diarrhea incidence in children. From calculation of prevalence ratio, exclusively breastfed children were 1,47 times more likely to experience less than twice diarrhea episodes before the age of 2 when compared to non-exclusively breastfed children (CI95% 1,10 – 1,95). Nevertheless, there were 15 non-breastfed

children who experienced less than twice diarrhea episodes which can be a result from good personal hygiene and correct knowledge on how to sterilize bottles.

The finding of this study supported prior study by Begum and Absar stating exclusive breastfeeding may prevent acute diarrhea incidence frequency in children under 2 years old. Bener, Ehlayel and Abdulrahman also found that exclusive breastfeeding has an important role in suppressing acute diarrhea in children. In Indonesia, studies by Sudyanto dkk, Rohmah dkk and Rizky dkk in Mojokerto, Bandung and Pontianak Timur respectively were conducted in babies under 6 months old and found significant relationship between exclusive breastfeeding and diarrhea incidence.<sup>11-15</sup>

Interestingly, studies overseas reveal higher percentage of exclusively breastfed

children compared to non-exclusively breastfed children in the samples taken. However, studies conducted in Indonesia including this study involved majority of non-exclusively breastfed children (62,9% compared to 37,1%). This may reflect the gap between the low coverage of exclusively breastfed children in Indonesia compared to other countries.

Secondary outcome of this study revealed that from all of children experiencing first episode of diarrhea under 12 months old, 64,7% were exclusively breastfed and 35,3% were not.

Chi-square test was employed with p-value 0,002 so that null hypothesis was rejected. From calculation of prevalence ratio, exclusively breastfed children were 3,10 more likely to experience first episode of diarrhea after the age of 1 when compared to non-exclusively breastfed counterparts (CI95% 1,47 – 6,27). This finding also corresponds to study by Begum and Absar which revealed exclusive breastfeeding can postpone age of first acute diarrhea occurrence in children under 2 years old. We still found 2 exclusively breastfed children who experienced first diarrhea episode before 12-months-old but both between 6-12 months old probably caused by poor hygiene of the complementary food given. Our finding is consistent with Lamberti et al stating protective effect of breastmilk is the highest in first 6 months of

life. From all of the children experiencing first diarrhea episode after age of 1, 6 patients (35,9%) were not exclusively breastfed which can be a result from good personal hygiene and correct knowledge on how to sterilize bottles.<sup>16,17</sup>

#### Study limitations

There are several limitations of this study including majority of samples was dominated with non-exclusively breastfed children, poor confounding factors control such as food recall and personal hygiene were not assessed and inevitable recall bias.

#### Conclusion

There is statistically significant relationship between exclusive breastfeeding and acute diarrhea incidence frequency which show that exclusively breastfed children experience less acute diarrhea episode. Exclusive breastfeeding also proven statistically significant to protect children from experiencing acute diarrhea earlier in life (< 12 months old).

#### Conflict Of Interest

The authors declare none.

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