

THE CORRELATION OF EXCLUSIVE BREASTFEEDING TOWARDS DECREASING OF INFECTIOUS DISEASES IN BABY AGED 6 – 12 MONTHS

Diinah Fadhilah¹, Yani Widyastuti², Dyah Noviawati Setya Arum³

¹²³Department of Midwifery, Health Polytechnic Ministry of Health Yogyakarta, Indonesia

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ABSTRACT

Infant mortality rate in Indonesia has increased in the last 5 years. The cause of death in infants aged 29 days to 11 months is dominated by infectious diseases. Previous research suggests that infectious diseases can be prevented by breastfeeding. Whereas, Exclusive Breastfeeding coverage in Sleman District has increased over the last 5 years. The purpose of this study was to determine the correlation of exclusive breastfeeding towards decreasing of infectious diseases in infants aged 6-12 months. This study was conducted from March to April 2018. This study was a correlative analytic observational study with a historical cohort design. The subjects of this study were children aged 6-12 months in the working area of Mlati II Public Health Center. Exclusive breastfeeding was assessed using interview and incidence of infectious diseases seen from medical records with a sample size of 130 babies with sampling using purposive sampling. The results showed that the low incidence of infectious diseases (60%) is greater than the high incidence of infectious diseases (40%). Statistical analysis with Chi-Square test obtained p value=0,000, so the analysis result was $p < 0.05$ which showed that there was the correlation of exclusive breastfeeding towards the incidence of infectious diseases in infants aged 6-12 months. RR value 2,00 (95% CI 1,450-2,759) on the incidence of infectious diseases. Children who received exclusive breastfeeding had a decreasing incidence of infectious diseases 2,00 times greater than non-exclusive breastfeeding. Multivariate analysis obtained p-value=0,017 means there was a correlation between exclusive breastfeeding, nutrition status, maternal education background, and socio-economic status to the incidence of infectious diseases in infants aged 6-12 months.

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Corresponding Author:

Diinah Fadhilah,
Department of Midwifery, Health Polytechnic Ministry of Health Yogyakarta,
Mangkuyudan Street, MJIII/ 304, Mantrijeron, Yogyakarta, Indonesia 55143. Telp : [\(0274\) 374331](tel:0274374331)
Email: fadhildiinah@gmail.com

INTRODUCTION

The public health rate is determined by a variety of factors including infant mortality rate (IMR) is closely associated with infectious diseases.¹ An infectious disease

that often causes infant deaths such as respiratory infections and gastrointestinal infections caused by bacteria and parasites that cause infants to have the fever, vomiting, shortness of breath, diarrhea, or other systemic symptoms.¹ Health Profile of Special Region of Yogyakarta showed that the number of infant mortality had decreasing trend from 2012 to 2016, respectively: 400 babies, 449 babies, 405 babies, 329 babies, then to 278 babies.² The causes of mortality infants aged 29 days to 11 months are dominated by infectious diseases such as pneumonia (29,5 %), diarrhea (11 %), furthermore caused by nerve disease (9 %) and congenital disorder (12,3 %). Similarly, the causes of mortality in children aged 1 year to 4 years are dominated by pneumonia (12,3 %), diarrhea (8,7 %), and meningitis (4,5 %).³

Infectious diseases can be prevented by giving breast milk which is the best food for babies. Breast milk contains the ideal nutrients for growth and development of the baby's brain. Other carbohydrates contained in breast milk can inhibit the growth of pathogenic germs such as *Streptococcus pneumonia* and *Haemophilus influenza*.⁴ Breast milk is useful for the body's resistance to infectious disease because of colostrum which is part of breast milk contains immunoglobulin M. Colostrum is breast milk's part that comes out the days after birth, colored clear or yellowish white. The knowledge about colostrum was bad and this reflected in Rikesdas in 2010 which report that people dump the colostrum partially (20,3%) and even dump the entire colostrum (5,6%).⁵

Exclusive breastfeeding for six months can help to prevent infectious diseases in infants. Research at Kediri Hospital concluded that longer breastfeeding can lower the episodes of diarrhea. Infants who are not exclusively breastfed for six months were twice as likely to suffer rotavirus diarrhea as compared to babies with exclusive breastfeeding.^{6,7} Diarrhea is rarely contracted in infants aged three months and under, presumably because the mother's antibody is passed on to the child through the placenta and breast milk.^{6,7} Cells in breast milk consists of macrophages, lymphocytes, and epithelial cells and amounts to approximately 4000/mm³, and this amount will rapidly decline after 2 -3 months.⁸ One indicator of good childhood immunity can be observed from the child's body's defense against infectious diseases. Infectious disease can be characterized by symptoms such as fever, cough, runny nose, and diarrhea.⁹ Theoretically, breast milk in form of IgA has an immunologic role so as to prevent susceptibility to infection. IgA is one of the mucosal immune systems, this antibody can bind to the pathogenic microorganisms' antigen that can not stick to the mucosa and inhibit its proliferation.¹⁰ The Health Profile of Special Region of Yogyakarta also shows that coverage of exclusive breastfeeding in the last 3 years got an upward trend. The result of a preliminary study at Mlati II Public Health Center revealed that from 10 medical record statuses of infant patients who experienced infectious disease less than 6 times at age less than one year, eight of them get exclusive breastfeeding. Based on that study, this study was aimed to determine the correlation of exclusive breastfeeding and the decreasing of infectious disease in infants aged 6 – 12 months.

METHOD

This study used analytic observational with historical cohort approach. The samples were divided into two groups that were the mothers who exclusively breastfed their infants and the mothers who non-exclusively breastfed their infants which included the inclusion and exclusion criteria. To collect the primary data through in-depth interviews are prepared questionnaires or questions on the sample of the mothers. To collect the secondary data were based on medical record status and mother and child health book (KIA book) of the baby being sampled in May 2017 to April 2018 according to their respective age.

The process of collecting data from 49 Integrated Service Posts (*Posyandu*) spread in three villages in the district of Mlati II Public Health Center was conducted with the area (cluster) random sampling. The data sampling was from Mlati II Public Health

Center which have 171 (N=171) toddlers from *Posyandu* in its district. Then to meet the minimal number of samples, so will be taken 76% (n=130) from the amount of toddler's data with cluster technique which is taken 76% from all the Integrated Service Post (49 *Posyandu*). So the samples will be taken from 37 random *Posyandu* to meet the minimal number of samples. After that, the samples will be taken during *Posyandu* activity. The respondents who present were selected according to these study criteria (inclusion and exclusion). The inclusion criteria, comprised of infants aged ≥ 12 months and ≤ 18 months with normal birth weight (2,5-3,9 kg), birth in normal gestational age (37-42 weeks), had immunized measles for 9 months of age, and willing to participating in this study. The exclusion criteria, comprised of children with a congenital disorder such as heart disease, brain, and so on, have physical or mental disabilities and/or have another disease.

The minimum number of samples is obtained from the formula of the sample for two sample problems which hypothesis test of two proportions. The sample size according to this calculation was 65 in this study divided into two groups, exposure group (+) were exclusive breastfeeding babies and exposure factor (-) were non-exclusive breastfeeding babies with a ratio 1:1, so the sample size for both groups were 130 babies. This study was conducted from March to May 2018.

Bivariate analysis with Chi-square, that collected data was analyzed by using Chi-Square test to know the correlation between exclusive breastfeeding and the incidence of infectious disease. The next analysis was to know the relativeness of two variables by the value of Relative Risk (RR). The magnitude of RR value indicates the relative of the two variables tested. The multivariate analysis was to know the correlation of more than one variable with one dependent variable that analyzing the influence of subject characteristics (nutrient status, maternal education background, and economic status) to the dependent variable (incidence of infectious disease) by using logistic regression statistic test.

RESULT

There were 130 babies in *Posyandu* of Mlati II Pubic Health Center, which met the criteria. Of these, there were 78 babies had a low incidence of infectious disease and 52 babies had a high incidence of infectious disease. The subject characteristics were also analyzed, nutrient status, maternal education background, and economic status. Table 1 presents the correlation between subject characteristics towards the incidence of infectious disease at both groups with chi-square analysis.

Table 1. Correlation of subject characteristics

Characteristic Subject	Incidence Of Infectious Disease				Z	%	P-value	RR	95% CI
	High		Low						
	n	%	n	%					
Nutritional Status							0,474	1,14	0,776 – 1,683
Not at risk	64	61,5	40	38,5	104	80			
At risk									
Mother's Education							0,717	1,05	0,795 – 1,396
High	34	61,8	21	38,2	55	42,3			
Elementary and Secondary	44	8,7	31	41,3	75	57,7			
Economic Status							0,782	0,95	0,672 – 1,904
Middle down	63	59,4	43	40,8	106	81,5			
Middle to upper	15	62,5	9	47,5	24	18,5			

The characteristic subject analyzed were independent variables which have influence with the incidence of infectious disease in this study were not significant in correlation statistically because $p\text{-value} > 0,05$.

Table 2 presents the correlation between primary variables were the independent variable, Exclusive Breastfeeding status, and dependent variable, incidence of infectious disease in baby aged 6 – 12 months.

Table 2. Correlation of Exclusive Breastfeeding Status and Incidence of Infectious Disease in Baby Aged 6-12 Months in Puskesmas Mlati II District

No	Breastfeeding Status	Incidence Of Infectious Disease				Z	X ²	p-value	RR	95% CI	
		Low		High						Maks	Min
		n	%	n	%						
1	Exclusive Breastfeeding	52	80	13	20	65	21,67	0,00	2,00	1,450	2,759
2	Non-exclusive Breastfeeding	26	40	39	60	65					

Table 2 shows RR (Relative Risk) value 2,000 with 95% CI (*Confidence Interval*) 1,450-2,759, it means RR value >1 with confidence interval had not to number 1, so the analyzed factor (exclusive breastfeeding status) was the real risk factor. Significant value was 0,000 or lower than 0,001 in the analysis of correlation exclusive breastfeeding status towards incidence of infectious disease, so the probability (p) under 0,05 means H_0 rejected, there was a significant correlation of exclusive breastfeeding status towards incidence of infectious disease in baby aged 6-12 months.

The next multivariate analysis used logistic regression shows contribution exclusive breastfeeding and other consideration variables towards incidence of infectious disease were 16,3%. The precision prediction this study was 70%. The p-value 0,017 in multivariate analysis means probability (p) under 0,05 so H_0 rejected, there was a significant correlation of exclusive breastfeeding status, nutrient status, maternal education background towards incidence of infectious disease in baby aged 6-12 months.

DISCUSSION

This study found foods and beverage which given to babies under six months so they were non-exclusively breastfeeding in Mlati II Public Health Center district were water, tea, instant porridge, formula milk, biscuit, and banana. To attain the exclusive breastfeeding coverage upward were inform to the pregnant woman and cares about the benefit of exclusive breastfeeding and breastfeeding management.

Breast milk was become immunity transmission lines from mother to their baby and being the important contributing factor in the neonate's immune system during the crucial period of immune system child development. The related factor with immunity, hormonal, enzymatic, trophic, and bioactive activity was into the breast milk, and also breast milk gave passive protection. Breast milk had so many cells from mother which produce cytokine and trigger modulator effect in neonates' immune system. High amount concentrated macrophage and leukocytes in the first lactation period were the primary cellular component of breast milk.^{11,19,20}

This study shows the correlation of breastfeeding towards decreasing of infectious disease in baby aged 6 – 12 months in Mlati II Public Health Center. This study supported by previous research, among others, by Liakartika in 2013 titled "The Relationship of Exclusive Breastfeeding with the Frequency of Pain in Babies 6-12 Months in Seyegan Public Health Center, Sleman Yogyakarta". The study stated that half of the babies sick in their 6 months of living, the amount of 19 respondent (63%) and 17 respondent (57%)

were non-exclusively breastfeeding. So the conclusion was there were a correlation between exclusive breastfeeding and frequency of sick incidence in baby aged 6- 12 months in Seyegan Public Health Center.¹²

Similar result with research by Abidah Nur in 2012 who stated that toddlers who non-exclusively breastfeeding had 1,4 higher risk than exclusively breastfeeding in incidence of infectious disease and there were significant correlation from p-value < 0,05.¹³ A study from India by Amarpreet Kaur in 2016 showed that 232 sample aged under 6 months who only got breast milk had morbidity because of gastroenteritis (94.12%), bronchopneumonia (88.24%), and bronchiolitis (100%) stayed in hospital under one week than the babies who non exclusively breastfed got the hospital stay more than one week.¹⁴ Another supported study from Ruowei Li, et al in 2014 titled "Breastfeeding and Risk of Infections at 6 Years" showed that ear, nose, and throat infection prevalence results in children aged 6 years were different according to the duration of breastfeeding's history and when the first time the child get formula milk. Children who had a duration of breastfeeding's history more than 9 months had lower OR than children who had a duration of breastfeeding's history > 0 until < 3 month.¹⁵

The correlation of incidence of infectious disease towards maternal education background was not significant because maternal education background variable was not the problem of infectious disease incidence, but mother's knowledge and behavior in baby care.¹⁶ Likewise, correlation of economic status was also not significant because children did not only need care from their parents, but also another factor such as their characteristic, home sphere, and so on. ¹⁶ Nutrient statuses were good for child immunity in their growth and development period. The child who had some deficiency of nutrients such as energy deficiency, vitamin A deficiency, Zn deficiency, and Fe deficiency would have more often infection and longer in duration.¹⁷

Multivariate analysis knew that B value was identic with the beta coefficient, 2,725. Because of beta coefficient was negative, so all the analyzed risk factor had a negative correlation with the incidence of infectious disease. It means exclusive breastfeeding, non-risk nutrient status, maternal high education, and middle-upper economic status would correlate with the low incidence of infectious disease, likewise the other hand because of negative correlation. This negative correlation was similar with research from Brazil on bronchiolitis patients in which it was concluded that exclusive breastfeeding was negatively correlated with hospital stay.¹⁸

This study indicated that RR value 2.000 with 95% CI 1,450-2,759 on the low incidence (under 3 times in aged 6-12 months) of infectious disease, means exclusive breastfeeding was the risk factor and the confident interval (CI) was not have number 1, so that risk factor exclusive breastfeeding more precision. Exclusive breastfeeding's baby had 2,0 higher risk than non-exclusive breastfeeding's baby in aged 6 – 12 months. Another analysis result also showed that p=0,000 (p<0,05), so there was a significant correlation between exclusive breastfeeding and the incidence of infectious disease in baby aged 6-12 months.

SUGGESTION

To the mothers who have the baby, it is necessary to increase realization about the benefit of exclusive breastfeeding, especially to the working mothers. To the midwife as health provider in Mlati II Public Health Center, it is necessary to inform about the importance of exclusive breastfeeding since preparing pregnancy and also antenatal care programs about it. The cadres in their area also need to support the mothers in the lactation period. To expand the domain of study, it is necessary to increase the sample size, enclose duration of breastfeeding, and improve controlling the confounding factor.

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