



PROTECTIVE EFFECT OF EXCLUSIVE BREASTFEEDING ON ACUTE RESPIRATORY INFECTIONS (ARI) AMONG CHILDREN IN TABANAN BALI

Putu Gede Suda Satriya Wibawa, Fx Wikan Indrarto[✉], Yoseph Leonardo Samodra

Faculty of Medicine, Universitas Kristen Duta Wacana, Yogyakarta, Indonesia

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Abstract

Background: ARI is one of the most causes child mortality in Indonesia due to their immature defense systems compared to adults. Intake of a toddler can affect the level of immunity against diseases, one of which is ARI. The aim of this study is to find out the correlation between exclusive breast feeding with the Incidence of Acute Respiration Infection in children.

Methods: This study was performed by observational analysis experimental design with cross-sectional method. The number of sample in this study was 70 children and the sample took from children that visit Puskesmas Tabanan III. Data were collected by Musfardi Rustam's (2010) questionnaire.

Results: Statistical bivariate analysis by the chi-square test show a correlation between exclusive breastfeeding with the Incidence of Acute Respiration Infection in children ($p < 0,01$). There were no correlations between age of the children ($p = 0,567$), mother's education level ($p = 0,601$), and children's gender ($p = 0,161$) with the Incidence of Acute Respiration Infection in children. **Statistical** bivariate analysis by Spearman rank show There were no correlations between low birth weight with the Incidence of Acute Respiration Infection in children.

Conclusion: There is a correlation that clinically and statistically significant between exclusive breastfeeding with the Incidence of Acute Respiration Infection in children. There were no correlations between the age of the children, mother's education level, children's gender and low birth weight with the Incidence of Acute Respiration Infection in children.

BACKGROUND

Exclusive breastfeeding is breastfeeding given to babies from birth for six months, without adding and/ or replacing with other foods or drinks (except medicine, vitamins, and minerals). Breast milk contains various types of cells in very high numbers. These cells consist of lymphocytes, neutrophils, macrophages, epithelial cells, and Ig A. Breast milk also contains nutrients needed by toddler including proteins, fats, carbohydrates, salts, minerals, and water (Almatsier, 2010). Exclusive breastfeeding will benefit the mother and baby. Benefits for babies include preventing diarrhea and ARI which can be caused by glutamate, unsaturated long-chain fatty acids, oligosaccharides, lysozyme, immunoglobulins, lipases, growth hormones and other bioactive ingredients in breast milk (Raheem et al., 2017). The benefits of breastfeeding for mothers are protecting maternal health, reducing postpartum bleeding, reducing the risk of breast cancer and ovaries, reducing anemia, extending the distance of the next pregnancy, more economical and practical (IDAI, 2013).

According to the psychological aspect, exclusive breastfeeding facilitates maternal sensitivity and attachment between mother and child. Other studies suggest that mothers who breastfeed tend to touch their babies more often, are more responsive to their babies, and spend more time looking at each other with their babies during breastfeeding compared to mothers who give formula milk to their babies (Krol & Grossmann, 2018).

Among the illnesses suffered by children, Acute Respiratory Infection (ARI) is the main cause of morbidity and mortality in children. ARI accounts for 4 million of the 15 million child deaths in the world each year. Chronic disorders such as deafness, difficulty breathing, and disability or disability in children, can result from ARI that is not handled properly (Ramani et al., 2016). Factors

that influence ARI in under-fives are agent (germ), host (host), and environmental factors. The host factors include gender, low birth weight (LBW), immunization status, and exclusive breastfeeding status. Environmental factors include the level of mother's age, mother's education, level of mother's knowledge, mother's occupation, family income, occupancy density, the presence of smokers, the use of anti-mosquitoes, and fuel for cooking (Syahidi et al., 2016)

METHODS

This study uses an observational analytic design with a cross-sectional approach. The population of this research is all children under five years old are in the working area of Primary Health Care of Tabanan III, totaling 2,427 children. Sampling is done by a nonprobability sampling method with a consecutive sampling technique. The sample in this study amounted to 70 toddler examined at Primary Health Care of Tabanan III from November to December 2018. Sampling was done by filling out the Rustam research questionnaire in 2010 that was modified (Rustam et al., 2019). The threat of bias can be minimized by using trained enumerators and Musfardi Rustam questionnaires that have proven their validity and reliability.

The independent variable in this study is exclusive breastfeeding with the dependent variable is the incidence of ARI in toddler. The variables suspected as confounding are age, mother's education level, and the sex of the toddler. This study uses bivariate data analysis, the chi-square test and the Spearman rank test to determine the correlation of the independent and confounding variables with the dependent variable.

RESULTS AND DISCUSSION

In table 1 it can be found that of 70 toddlers who sought treatment at the Primary Health Care

of Tabanan III, Tabanan Bali is known that the gender of the most toddlers who seek treatment is male as many as 37 toddlers. It is known that the age of the toddler who most often seek treatment at the Primary Health Care of Tabanan III is toddlers aged 13-36 months that is as many as 39 toddlers. Based on the table can also be seen if the lowest age seeking treatment is toddlers aged 0-12 months that are as many as 12 toddlers. Of 70 toddlers seeking treatment at the Primary Health Care of Tabanan III, Tabanan Bali from November to December 2018 38 toddler were suffering from ARI and 32 toddler who did not suffer ARI. Of the 38 toddlers suffering from ARI, it is known that 38 toddlers suffer from coughs or colds, 35 toddlers suffer from fever, and 5 toddlers who suffer from shortness of breath. Of the 38 toddlers who suffer from coughs or colds, it is known that the frequency of coughing or colds in the last month was 5-8 times experienced by 22 toddlers.

Table 1. Data of toddler frequency

	Frequency	
Gender	Female	33
	Male	37
Age	0-12 months	12
	13-36 months	39
	37-60 months	19
The incidence of ARI	ARI	38
	No ARI	32
Description of ARI	Cough and cold	38
	Fever	35
	Shortness to breath	5
The frequency of coughing or colds in the last month	1 – 4 times	16
	5 – 8 times	22
The frequency of fever in toddler affected by ARI in the last month	1 – 4 times	19
	5 – 8 times	16
Exclusive breastfeeding	Exclusive breastfeeding	34
	No exclusive breastfeeding	36
The age of the first toddler being given substitute food for breast milk	1-12 months	60
	13-24 months	10
Problems in breastfeeding	ASI does not come out or is lacking	18
	The child is sick or weak	2
	Mother is sick or weak	8
	Mother is working	8
Toddler's birth weight	Low birth weight	1
	No low birth weight	69
Food is given at the age of 0-6 months	Formula milk	35
	Mashed / solid food / porridge	1
	No food is given	34

Table 1 also shows that of the 35 toddlers who suffer from fever, it is known that in the past month toddlers most often have fever as much as 1-4 times with a total of 19 toddlers. Of 70 toddlers seeking treatment at the Primary Health Care of Tabanan III, Tabanan Bali from November to December 2018 34 toddlers received exclusive breastfeeding with a percentage of 49% of the total subjects, and 36 toddlers who did not get exclusive breastfeeding, with a percentage of 51% of the total subjects. Of 70 toddlers seeking treatment at the Primary Health Care of Tabanan III, Tabanan Bali from November to December 2018 is known if food other than breast milk is most often given the first time when toddlers aged 1-12 months, as many as 60 toddlers and 10 toddlers at the age of 13-24 years.

As many as 70 mothers who examined their children under five years old at Tabanan III Community Health Center, 36 mothers experienced problems in breastfeeding. The most common problem in breastfeeding is breastfeeding that does not come out, or the frequency of breast milk is small with a total incidence of 18 mothers. Mothers who are sick and busy working are the second cause of not giving ASI to 8 children. In the third position is occupied by a sick or weak child with a total of 2 toddlers. Of the 36 mothers who did not give exclusive breastfeeding to their toddlers, it is known that the most common breast milk substitute food or drink given is formula milk with a total of 35 toddlers, while the pulverized or solid food or porridge is the food most rarely given, namely 1 toddler. It is known that from 70 research subjects, there were 69 babies born without LBW and only 1 baby was born with LBW in the Primary Health Care of Tabanan III, Tabanan Bali.

Of the 70 mothers who examined their children under five years old at Primary Health Care of Tabanan III, it is known that the highest level of education of mothers is 21 universities. The second position is high school with 19 people

and followed by middle school in the third position with 13 people.

Based on table 2, the value of $p < 0.01$ can be obtained so that it can be stated if the Exclusive ASI variable has a statistically significant correlation with the incidence of ARI in toddler because it has a value of $p < 0.05$. The r value obtained from the correlation test (-0.657) states that there is a strong correlation between the two variables. $P\text{-value} > 0.05$ (0.567) which means there is no significant correlation between age and ARI incidence in toddler. From the table, it is known if the value of $r = 0.052$ which means there is a very weak correlation between variables. $P\text{-value} > 0.05$ (0.601) means there is no significant correlation between the level of maternal education with the incidence of ARI in toddler and there is a weak correlation between variables ($r = 0.108$). $P\text{-value} > 0.05$ (0.161) which means there is no meaningful correlation between sex and ARI incidence in toddler and the correlation between the two variables is weak ($r = 0.167$). $P\text{-value} = 0.363$ so that it can be stated if the weight of a low birth baby does not affect the incidence of ARI in toddler because it has a value of $p > 0.05$. The r value obtained from the correlation test (0.110) states that there is a weak correlation to the LBW and ARI variables.

Based on the results of an analysis of research on the correlation of exclusive breastfeeding with the incidence of ARI, the results obtained $p < 0.01$, which means there is a correlation between exclusive breastfeeding with the incidence of ARI in toddler. From the results of the study, it is also known if there is a strong correlation between the variables concluded based on the value of $r (-0,657) > 0.5$. The negative sign (-) in the r value indicates that the correlation of the breastfeeding and ARI variables is the correlation in the opposite direction which means that the higher the number of children under five consuming breast milk, the lower the number of children under five suffering from ARI.

Based on previous research it was found that breastfeeding can prevent acute respiratory and gastrointestinal infections in children up to at least 6 months of age, with the duration of breastfeeding exclusive breastfeeding tends to continue to provide a protective function against otitis media even after breastfeeding stops (Frank et al., 2019). Other studies have also shown that breastfeeding for 6 months or more is significantly associated with a reduced risk of LRTI (Low Respiratory Tract Infections) or lower respiratory tract infections until the age of 4 years old children (AOR: 0.71; 95% CI: 0.51- 0.98) (Tromp et al., 2017). Research by Umami et al. (2014) also states

that there is an influence of exclusive breastfeeding on the low incidence of ARI in toddlers aged 0-6 months in the Working Area of the Public Health Center in Malang Municipality.

This is also supported by the results of research from (Rustam et al., 2019) which states that there is a correlation between exclusive breastfeeding and the incidence of ARI in toddler aged 6-12 months in Kampar District, where toddler who are not exclusively breastfed risk 1.69 times for ARI compared to babies who are exclusively breastfed after being controlled by the presence of smoking in the home and immunization variables.

Table 2. Analysis test results

	ARI	No ARI	Total	p	r
Exclusive breastfeeding	7	27	34	<0,01	-0,657
No exclusive breastfeeding	31	5	36		
Total	38	32	70		
0-12 months	2	7	12	0,567	-0,052
13-36 months	23	16	39		
37-60 months	10	9	19		
Total	38	32	70		
Primary school	4	1	5	0,601	0,108
Middle school	6	7	13		
High school	12	7	19		
Diploma	6	6	12		
Undergraduate	10	11	21		
Total	38	32	70		
Male	23	14	37	0,161	0,167
Female	15	18	33		
Total	38	32	70		
Low birth weight	1	0	1	0,363	0,110
No low birth weight	37	32	69		
Total	38	32	70		

Based on research, toddlers who get exclusive breastfeeding tend to be less affected by ARI than those who do not get exclusive breastfeeding. A comparison of the number of toddlers who get exclusive breastfeeding with toddlers without exclusive breastfeeding is 1: 3 (Rustam et al., 2019). The results of this study are also in line with research conducted in Grogol, Jakarta that toddler given intake other than breast milk are more at risk of developing diarrhea and ARI (Priyasna et al., 2019).

Breast milk contains various types of cells in very high numbers. These cells consist of lymphocytes, neutrophils, macrophages, and epithelial cells. For example, colostrum contains about eight million cells per million and also contains nutrients suitable for toddlers including 8.5% protein, 2.5% fat, 3.5% carbohydrate, 0.4% salt and minerals, and water 85.1%. The number of cells in colostrum will decrease rapidly after a few days of breastfeeding, but the decreased number of cells is offset by an increase in the volume of milk produced per day. A new baby's body produces sufficient amounts of immunoglobulin, at the age of 3-4 months. When the baby's innate immunoglobulin levels are not enough to protect the baby from infectious diseases, breastfeeding will be useful as a prevention of infectious disease in toddlers. Breast milk contains immune substances that can protect babies from various bacterial, viral, and fungal infectious diseases. One of the important immune substances for infant immunity is Ig A. Ig A can protect the baby's body from infectious diseases, one of which is respiratory infections. Most of all of this substance are channeled through breast milk, with high concentrations, namely in the first days 500mg per 100ml which then decreases to 30mg per 100ml. Besides, that breast milk contains cellular immune substances in the form of macrophage cells (leukocytes) which also help protect and prevent other infections from the outside. Exclusive breastfeeding for 4-6 months will ensure the baby

remains healthy and protected from infectious diseases including respiratory infections and provides an opportunity for babies to grow into healthy humans (Almatsier, 2010; IDAI, 2013).

Based on the research results, it is known that there is no correlation between LBW, toddler age, mother's education level, and gender of toddlers with ARI in toddlers. In this study, no further analysis was carried out on the factors causing these results because the researchers did not research these factors, therefore it is necessary to do further research on other factors that influence the incidence of ARI in toddler.

CONCLUSION

There is a correlation between exclusive breastfeeding and the incidence of ARI in toddler with exclusive breastfeeding as a protection against ARI. There is no correlation between LBW, toddler age, mother's education level, and gender of toddlers with ARI in toddlers.

Mothers are expected to give exclusive breastfeeding to toddler because exclusive breastfeeding contains nutrients and substances that can help toddler avoid infectious diseases, one of which is ARI. Based on the results of the study it is also known that toddlers who do not get exclusive breastfeeding have a 4 times greater risk of suffering from ARI than toddlers who are given exclusive breastfeeding, so toddlers need to be given exclusive breastfeeding.

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