



Relationship Between Low Birth Weight Babies and Exclusive Breastfeeding with the Incidence of Acute Respiratory Tract Infections in Toddlers

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Abstract. Acute Respiratory Infection (ARI) is an acute inflammation of the upper and lower respiratory tract mucosa caused by virus or bacterial pathogenic. There are several risk factors for the occurrence of ARI in toddlers, including low birth weight (LBW) babies and exclusive breastfeeding. The recurrence rate for ARI is quite high, usually occurring seven times per year in children and twice per year in adults. The purpose of this research is to analyze the relationship between Low Birth Weight Babies and Exclusive Breastfeeding with the Incidence of Acute Respiratory Tract Infections in Toddlers at the Lebdosari Community Health Center, Semarang City. This research method is quantitative research with an analytical observational design, with a cross sectional approach. Secondary data was obtained from medical record. This research showed that there was a significant relationship was found between exclusive breastfeeding and the incidence of acute respiratory infections in toddlers. There was no significant relationship between low birth weight and the incidence of ARI in toddlers.

Keywords: ARI, Respiratory, Low Weight Birth Babies, Exclusive Breastfeeding.

1. Introduction

Acute respiratory tract infection or what is commonly called ARI is acute inflammation of the upper (nose, paranasal sinuses, nasopharynx, oropharynx) and lower (epiglottis, larynx, trachea, bronchi, bronchioles, alveoli, and lungs) respiratory tract mucosa.[1] The etiology of ARI is several types of viruses, bacteria, fungi and other microorganisms. The course of acute respiratory illness (ARI) in children is influenced by a multitude of factors, such as age, gender, low birth weight (LBW), exclusive breastfeeding, immunization, nutritional status, socioeconomic position, and environmental factors.[1]

ARI often occurs in children under 5 years of age. ARI cases constitute 50% of all illnesses in children under five. Based on research conducted by The Board on Science and Technology for International Development (BOSTID), the incidence of ISPA in children under 5 years old reached 12.7-16.8 episodes per 100 children per week. ARI causes 15%

of all deaths in children under 5 years globally.[2] ARI causes 3.5% of morbidity and one fifth of mortality in children under five years of age (toddlers) in the world.[3] Based on Riskesdas 2018, the incidence of ARI in Indonesia in 2018 were 12.8%, of which 13.8% occurred in Central Java.[1] Based on the 2022 Semarang City Health Profile, there are 4.203 toddler pneumonia sufferers, 92 of whom had pneumonia heavy. This figure has increased the total number of toddler pneumonia (2017 in 2021), and experienced an increase in the number of cases severe pneumonia from 84 to 92 (9.52%).[4]

Even though it is classified as an acute infection, the recurrence rate for ARI is quite high, usually occurring seven times per year in children and twice per year in adults. The high prevalence and recurrence rate of ARI causes high visits to doctors, high consumption of antibiotics, loss of work time for parents, and has an impact on the lives of sufferers and their families.[1]

Agus et al stated that there was a significant relationship between birth weight, breast milk and cigarette exposure on the incidence of acute respiratory infections in toddlers

There has been a lot of research on ARI. Agus, et al (2021) stated that there was a significant relationship between birth weight, breast milk and cigarette exposure on the incidence of acute respiratory infections in toddlers.[3] Adius et al (2019) found research results show that there was an association between exclusive breastfeeding and cigarette smokes at home and the incidence of ARI in toddlers.[5] Tazinya et al (2018) stated that the proportion of ARI is high in passive smokers, while breastfeeding factors are not related to the ARI incidence [6].

ARI can be categorized into upper and lower ARI. Upper ARI includes Rhinitis, CROUP, Sinusitis, Pharyngitis, Epiglottitis, and Laryngitis. Lower ARI includes Pneumonia, Bronchitis, Bronchiolitis, and Influenza.[2][7][8] ARI in toddlers aged 2-59 months is categorized based on the severity of the disease, namely severe pneumonia, pneumonia and non-pneumonic cough.[7]

Based on the still high incidence and recurrence of ARI in children under five, researchers are interested in analyzing relationship between between Low Birth Weight Babies and Exclusive Breastfeeding with the Incidence of Acute Respiratory Tract Infections in Toddlers at the Lebdosari Community Health Center, Semarang City. Lebdosari Health Center is a primary level government health facility located in the center of Semarang city.

2. Methods

The research was conducted in August-September 2023 at the Lebdosari Health Center, Semarang. This research is an analytical observational study with a case control design. This research data was taken from medical records. The research population was toddlers who visited the Lebdosari Health Center in January-May 2023.

Sampling using non-probability sampling based on inclusion criteria : a). Age 12-59 months, b). Have complete medical record. Exclusion criteria consist of : a). Incomplete immunization status, b). Poor nutritional status, c). Independent medical expenses d). Congenital anomaly. This research data collection has obtained approval from the Health Research Ethics Committee Universitas Muhammadiyah Semarang with No.027/EC/KEPK-FK/UNIMUS/2023.

3. Results

There were 140 toddlers obtained, consisting of 70 toddlers with ARI and 70 toddlers non-ARI. Table 1 shows the characteristics of respondents. Most respondents were 36-47 and 48-59 months old (25,7%), and 36-47 months old (27,1%) in the non-ARI group. There were more male respondents in both groups (51.4% ARI group; 54,3% non-ARI group). As many as 2 (2.9%) of 70 toddlers suffering from ARI had a LBW history. A total of 68 (97.1%) of the 70 non-ARI toddlers had normal birth weight. There were 37 toddlers (52.9%) of the 70 toddlers with ARI were not getting exclusive breast milk. Whereas 50 (71,4%) of the 70 non-ARI toddlers were getting exclusive breast milk.

Table 2 shows the relationship between LBW and Exclusive Breastfeeding history with the Incidence of ARI Infections in Toddlers. Through the chi square test, it was found that there wasn't a significant relationship between low birth weight babies with the Incidence of ARI Infections in Toddler, where the p value = 0,690 ($p > 0,05$). Through the chi square test, it was found that there was a significant relationship between exclusive breastfeeding with the Incidence of ARI Infections in Toddler, where the p value = 0,037 ($p < 0,05$). The odds ratio (OR) = 1.955 shows that toddlers who are not getting exclusive breastfed have a 1.95 times greater risk of suffering from acute respiratory infections than toddlers who are exclusively breastfed.

4. Discussion

Most of the toddlers who visit the Lebdosari Health Center in Semarang are boys, both ARI and non-ARI sufferers. This is in accordance with research by Izza et al and Wibawa et al, which states that the most common gender among non-ARI toddlers is male. However, in the ARI group, it was found that the non-ARI toddlers were more female. This difference in results is due to differences in research locations.[9][10]

The largest age in the ARI group is 36-59 months. Meanwhile, in the non-ARI group, the majority were aged 36-47 months. This is in accordance with research by Windhi et al which states that the majority of ARI sufferers under five start from the age of 2 years, while the non-ARI group is mostly aged 1 year.[11] This is because toddlers aged 1 year are still close to their mother or caregiver, and rarely leave the house so they are rarely contaminated

with bacteria or viruses. Meanwhile, 2 year olds often play outside the house so they are more susceptible to illness.[12][13]

The results of this study showed no connection between low birth weight and the prevalence of ARI in toddlers. These findings contradict those of a study by Lestari et al., which found a substantial correlation between low birth weight infants and toddler incidence of ARI.[14] A major contributing factor to ARI-related deaths is low birth weight. Up to 22% of pneumonia-related deaths are thought to happen in children whose birth weight was low in the past. This has to do with low birth weight babies' weakened immune systems.[2][14]

This research obtained results that were in line with research by Kusnan et al., which states that the majority of toddlers with ARI did not get exclusive breast milk. Breast milk regulates the body's immune response, because breast milk contains abundant immunoglobulins (such as lactoferrin, lysozyme, and cytokines). Immunoglobulin contains macrophages that will eat dangerous microorganisms, and also targets certain bacteria. Breast milk also contains abundant oligosaccharides, so it is a probiotic and modulates the immune system. Breast milk also has anti-bacterial effects.

According to this study, infants who were not breastfed exclusively had a 1.95-fold higher chance of developing ARI than toddlers who were. The findings of this study support a study by Amalia et al. that found children who were not breastfed had a 2.3 times higher chance of having ARI than toddlers who were breastfed exclusively.[15]

Exclusive breastfeeding is when babies aged 0-6 months are given only breast milk without additional food or other formula milk.[7] Breast milk contains many beneficial components that boost the immune system in the short and long term immune.[16] Compared to children who were given formula milk, children who were breastfed experienced an increased antibody response to vaccines and long-term protection from infection. Several studies have shown that breastfeeding can reduce the risk of respiratory disease in children up to the age of 7 and reduce the prevalence of Haemophilus influenzae type b (Hib) infection in child that less than 10 years old.[3][5].

Table 1. Sample characteristics and frequency based on age, gender, birth weight, and exclusive breastfeeding

Variable	ARI				Total	
	Non ARI		ARI		n	%
	n	%	n	%		
Age						
12 – 23 months	17	24,3	16	22,9	33	23,5
24 – 35 months	17	24,3	18	25,7	34	24,2
36 – 47 months	18	25,7	19	27,1	37	27,3
48 – 59 months	18	25,7	17	24,3	35	25
Gender						

Variable	ARI				Total	
	Non ARI		ARI		n	%
	n	%	n	%		
Male	36	51,4	38	54,3	74	52,8
Female	34	48,6	32	45,7	66	47,2
Birth weight						
Low birth weight	2	2,9	2	2,9	4	2,8
Normal birth weight	68	97,1	68	97,1	136	91,2
Exclusive breastfeeding						
No	20	28,6	37	52,9	87	62
Yes	50	71,4	33	47,1	53	38

Table 2. Relationship between Low Birth Weight Babies and Exclusive Breastfeeding with the Incidence of ARI Infections in Toddlers

Variable	ARI				p	OR
	Non ARI		ARI			
	n	%	n	%		
Birth weight						
Low birth weight	2	2,9	2	2,9	0,690	
Normal birth weight	68	97,1	68	97,1		
Exclusive breastfeeding						
No	20	28,6	37	52,9	0,037	1,955
Yes	50	71,4	33	47,1		

5. Conclusion

In the Lebdosari Semarang health center region, this study examines the association between low birth weight neonates and exclusive breastfeeding on the incidence of ARI under five. The frequency of acute respiratory infections in toddlers and exclusive breastfeeding were found to be significantly correlated. Low birth weight was not significantly correlated with the incidence of ARI in toddlers.

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