

# A Review Article: Relationship of Breastfeeding Patterns with The Incidence of ARI (Acute Respiratory Infections) In Toddlers

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Abstract: The reviewed literature aims to determine the relationship between breastfeeding patterns and the incidence of ARI in toddlers. This research method uses a *literature review study*, with researchers whose role is to find and combine essences and analyze facts from several scientific sources that match valid and accurate criteria. The data used in this study are all journals obtained from *literature reviews* containing the concepts studied drawn from the 2018-2022 range. References are used by doing *literature searches* from the Google Scholar and PubMed *databases*. Of the 18 journals of research articles based on 2 databases, namely Google scholar and PubMed, 8 research journals show a significant relationship between breastfeeding patterns and the incidence of ARI in toddlers. The pattern of exclusive breastfeeding correlates with the incidence of ARI in toddlers, both pneumonia and non-pneumonia. Toddlers who do not get exclusive breastfeeding are more prone to experiencing the incidence of ARI than toddlers who get exclusive breastfeeding. Reviews Literature aims to provide information related to the relationship between breastfeeding patterns with the incidence of ARI in toddlers.

## 1 INTRODUCTION

ARI (Acute Respiratory Infection) is one of the infectious diseases that often occur in toddlers. According to WHO, as many as 13 million children under five in the world die every year and most of these deaths are found in developing countries, where ARI is one of the main causes of death of as many as 4 million children under five every year (Firza et al., 2020). The results of the 2018 Basic Health Research (Riskesdas) show that the prevalence (incidence rate) of ARI in Indonesia has decreased compared to the results of Riskesdas 2013, from 25% to 9.3% and the prevalence of ARI in toddlers by 7.8%. Meanwhile, the prevalence of pneumonia in toddlers also decreased from 18.5% to 4.8% (Kemenkes RI, 2018). In 2019 the pneumonia mortality rate in toddlers became the second cause of death after diarrhea in infants and children under five (Kemenkes RI, 2020).

According to WHO, ARI is a form of inflammation of the lung tissue characterized by symptoms of

coughing and shortness of breath that hits the lung tissue (alveoli). ARI is classified into two, namely upper respiratory tract infections and lower respiratory tract infections. Upper respiratory tract infections are common in children and are rarely life-threatening. Infectious diseases of the lower respiratory tract such as pneumonia and bronchiolitis are the main contributors to deaths from ARI (Imran et al., 2019).

The incidence of ARI in toddlers certainly has risk factors that aggravate the problem. The risk factors that exacerbate the problem of ARI in toddlers are numerous including sex differences, birth history (BBLR), nutritional status conditions, smoking habits of family members, exclusive breastfeeding, immunization status, and economic status conditions. These risk factors need to be studied more deeply, by analyzing the relationship and influence on the occurrence of ARI in toddlers.

According to WHO, breastfeeding patterns in toddlers are defined into three categories, exclusive breastfeeding, predominant breastfeeding, and

partial breastfeeding. Exclusive breastfeeding with only breast milk without other foods and drinks. Predominant breastfeeding by breastfeeding but once given a water-based drink. Partial breastfeeding by giving artificial food before the age of 6 months (Nur Alim, 2019). Breastfeeding children is very important and must be supported by various parties, such as families, communities, and the government. In this day and age, mothers who are breastfeeding lack knowledge, even though this greatly affects the nutritional status of toddlers. In this case, breastfeeding patterns in toddlers need to be analyzed more deeply regarding differences and influences on the incidence of ARI in toddlers.

In developing countries where Indonesia is one of them, infant mortality due to ARI is still a health problem that needs attention. This happens due to several factors, both intrinsic and extrinsic. One of the most influential factors is the pattern of breastfeeding in babies. Breast milk contains many important nutrients for babies, one of which is the formation of antibodies that can form the immune system in babies at a growth and development age, reducing the risk of infectious diseases.

For this reason, we studied the relationship between breastfeeding patterns and the incidence of ARI in infants to minimize or prevent mortality and the incidence of ARI in infants during growth and development. With this, Indonesians can find out the simplest way they can do it, by providing the right breastfeeding pattern for toddlers. Because toddlers with less nutrition will be easier to contract infectious diseases.

## 2 METHODS

This research method uses a literature review study, with researchers whose role is to find and combine essences and analyse facts from several scientific sources that match valid and accurate criteria. The data used in this study are from all journals obtained from literature reviews containing the concepts studied. This paper was formed based on information sources obtained from 18 articles from National journals and international journals published in the 2018-2022 range. References were used by conducting literature searching from the Google Scholar and PubMed databases with the keywords acute respiratory infections, pneumonia, and non-pneumonia, breastfeeding, breastfeeding duration, human milk, and children. The selection of articles was carried out by conducting a review of the title, abstracts, and results that discussed the relationship between breastfeeding patterns and the incidence of acute respiratory infections in toddlers. The reason for using *the literature review* study is to be able to find out the results of related research that has been carried out by previous researchers so that they can produce accurate information according to the criteria.

## 3 RESULTS

From searching journals through databases such as Google Scholar and PubMed about the relationship of exclusive breastfeeding to the incidence of ARI in toddlers, with the range of 2018-2022 obtained that are by the criteria where there are National journals and International journals obtained that:

Table 1. Analysis of Articles on the Relationship of Breastfeeding Patterns with the Incidence of ARI in Toddlers

No.	Author, Year	Heading	Category	Research Methods	Result	Conclusion	References
1.	Medya Aprilia Astuti, Nani Nurhaeni (2019)	Pengaruh Durasi Menyusui terhadap Kejadian Pneumonia pada Balita: A Systematic Review	Pneumonia	Systematic Review	Breastfeeding patterns are significantly associated with the incidence of pneumonia and respiratory tract infections and the duration of breastfeeding is also associated with the incidence of	It can be concluded that breastfeeding can affect the incidence of pneumonia both lowering and increasing depending on the duration of breastfeeding.	Google Scholar

					pneumonia and respiratory tract infections.		
2.	Putu Anggi Widia Karmany, Setyo Sri Rahardjo, Bhisma Murti (2020)	The Effects of Non-Exclusive Breastfeeding on the Risk of Pneumonia in Children under Five: Meta-Analysis	Pneumonia	Meta-Analysis Study	The results showed that breastfeeding without fluids or other foods for less than six months had a 3.99 times greater risk of pneumonia compared to toddlers who were exclusively breastfed.	Toddlers who are not exclusively breastfed have a fourfold risk of developing pneumonia compared to toddlers who are exclusively breastfed.	Google Scholar
3.	Biruk Beletew, Melaku Bimerew, Ayelign Mengesha, Mesfin Wudu dan Molla Azmeraw (2020)	Prevalence of pneumonia and its associated factors among under-five children in East Africa: a systematic review and meta-analysis	Pneumonia	Systematic review and meta-analysis	A systematic review and meta-analysis revealed the use of wood as a source of fuel, cooking food in the living room, and holding children back while cooking. food, unvaccinated, history of exclusively not breastfeeding, history of upper respiratory tract infections, and parents who smoke as significant risk factors increased the prevalence of pneumonia among children under five in East Africa.	The prevalence of pneumonia in toddlers in East Africa remains high. The use of wood as fuel source, cooking food in the living room, caring for the child in the mother during cooking, unvaccinated, exclusive breastfeeding, the child's history of ARI, and parents who smoke are independent potential predictors toddler pneumonia in East Africa. Therefore, potential determinants such as: health education on exclusive breastfeeding, premises	PubMed

						cooking food, increasing vaccination coverage early and recommended respiratory tract infection control to prevent such risk factors.	
4.	Erma Mariam (2020)	Hubungan Pemberian ASI Eksklusif dengan Kejadian Pneumonia Pada Balita di Puskesmas Yosomulyo Kecamatan Metro Pusat Kota Metro	Pneumonia	Analytical research with a <i>cross-sectional</i> approach	The results of the study showed that toddlers at the Yosomulyo Health Center experienced an incidence of pneumonia because children did not get exclusive breastfeeding, so their immune system was lower than that of children who received exclusive breastfeeding.	At Puskesmas Yosomulyo Metro Downtown Metro, there is a correlation between exclusive breastfeeding and the incidence of pneumonia in toddlers	Google Scholar
5.	Melinda Fauziah, Henny Cahyaningsih, Haris Sofyana, Sri Kusmiati (2021)	Hubungan Riwayat Pemberian ASI dengan Kejadian Pneumonia pada Balita	Pneumonia	Analytical survey with a <i>cross-sectional</i> approach	The results showed that in the prevention of pneumonia in toddlers it is known that exclusive breastfeeding has a role in toddlers in the prevention of pneumonia.	It was found that the results of the study at the Bandung City Health Center correlated with the incidence of pneumonia and exclusive breastfeeding in toddlers.	Google Scholar
6.	T. Sy Rafni Nahabila, Buchari Lapau, Herniwan ti (2018)	Faktor Risiko Kejadian ISPA Non-Pneumonia pada Anak Balita di Wilayah Kerja Puskesmas Harapan Raya Kota Pekanbaru	Non-Pneumonia	<i>Analytic cross-sectional</i>	It is known that there are five independent variables related to non-pneumonia ARI such as room temperature, air humidity, ventilation, mosquito repellent use,	Variables related to the cause of the incidence of non-pneumonia ARI are mosquito coil burns, the presence of smokers, and	Google Scholar

					and the presence of smokers. From the multivariate analysis, it is known that the variables related to the incidence of Non-Pneumonia ARI are the variables of mosquito repellent use, the presence of smokers, and room temperature.	room temperature. The use of mosquito repellent produces smoke and pollutes the air so there is a risk of non-pneumonia ARI in toddlers.	
7.	Ratih Tri Agustin, Leni Laelia, Ayu Idaningsih (2018)	Hubungan Pemberian ASI Eksklusif dengan Kejadian Ispa (Batuk Non-Pneumonia) Pada Balita di Wilayah Kerja UPTD Puskesmas DTP Maja Kabupaten Majalengka Tahun 2016	Non-Pneumonia	Quantitative research, with a <i>Cross-Sectional</i> approach	The results showed that there was a relationship between exclusive breastfeeding and the incidence of ARI (non-pneumonia) in toddlers in the UPTD Working Area of the Maja DTP Health Center, Majalengka Regency in 2016. The existence of this relationship is because toddlers do not get exclusive breastfeeding so their immune system becomes less prone to respiratory diseases or infections such as ARI.	It can be concluded that it is proven that there is a relationship between exclusive breastfeeding and the incidence of ARI (non-pneumonia) in toddlers, thus the efforts of health workers to prevent and reduce the incidence of ARI (non-pneumonia) include improving clean and healthy living behaviors of each family, including ensuring that their children get exclusive breastfeeding.	<i>Google Scholar</i>
8.	Elta Nora, Evy Marlinda, Theresia Ivan (2018)	Faktor - Faktor Intrinsik dan Ekstrinsik Kejadian Infeksi Saluran Napas pada Balita	Non-Pneumonia	Quantitative research, with a <i>Cross-Sectional</i> approach	The results showed that the incidence of ARI at the Pekauman Health Center from 117 samples of 71 toddlers was	Most of the toddlers at the Pekauman Banjarmasin Health Center suffer from non-pneumonia ARI. Intrinsic	<i>Google Scholar</i>

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included in non-pneumonia ARI and 46 toddlers included ARI pneumonia. and extrinsic factors related to the incidence of ARI in toddlers at the Pekauman Banjarmasin Health Center are gender, exclusive breastfeeding, moderate economic status, and health behaviors.

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## 4 DISCUSSIONS

### Risk Factors for the Emergence of ARI Events in Toddlers

#### Sex Differences

From the results of the literature review, it was found that there was a correlation between sex and the risk of ARI incidence in toddlers (Syahputra, 2012). In general, the physical condition and body arrangement of boys and girls are different (Iskandar, 2014). Boys prefer to play in dirty and dusty places and do a physical activity more often than girls, which makes it easier for boys to get ARI. In addition, there are hormonal factors where in men there is the hormone testosterone which can interfere with the inflammatory response when an infection occurs. Meanwhile, in women, there is a hormone 27 beta-estradiol which can stabilize and increase the immune reaction in the event of an infection.

However, according to WHO (2017), there are only slight differences in prevalence by sex in male and female toddlers. This is likely due to the undercooking of lung function in male toddlers who are more often exposed to ARI.

#### Birth History (BBLR)

From the results of the literature review, it was found that there is a correlation between birth weight and the risk of ari incidence in toddlers, namely toddlers born with low body weight are more susceptible to ARI than toddlers born with normal weight. This is due to the emergence of growth disorders, maturation of tools, rudimentary organs, and immunity to diseases that are still very

weak. As a result, there are infections and complications in toddlers that can cause fatal molarity (Nasution, 2020).

Thus, babies born normally have a lower potential to get ARI compared to toddlers who have less birth weight, this is also in line with other studies by Firda (2015).

#### Nutritional Status Condition

From the results of the literature review, it was obtained that there was a correlation between nutritional status conditions and the risk of ari incidence in toddlers. Toddlers who have poor nutritional status conditions are many times more than toddlers who have sufficient and fulfilled nutritional conditions. Based on the opinion of Harjatmo et al (2017), good nutritional status is not easy to make a person attacked by diseases, both infectious diseases and degenerative diseases though.

Irregular eating intake and unbalanced fulfillment of food nutrients lead to poor nutrition in toddlers. Food intake greatly affects the effect of the body's resistance to boosting the body's immune system. Especially protein which is the main source of nutrients that play a role in the body's metabolism. However, the condition of nutritional status is not the most influential thing in the risk of ari events in toddlers, but there are also other supporting factors, such as improper nutrition patterns in toddlers, factors of lack of parental knowledge about the risk of ari events, and environmental factors.

### **Smoking Habits of Family Members**

From the results of the literature review, it was obtained that toddlers who have family members with smoking habits are many times more likely to be attacked by ARI. This indicates that there is a correlation between the smoking habits of family members and the risk of ari incidence in toddlers. The respiratory system of toddlers who are still weak is easily disturbed by exposure to cigarette smoke (Yanti and Sari, 2018).

The smoking habits of family members in addition to affecting the risk of ari incidence in toddlers can also harm the smoker himself, which shows the lack of awareness of family members about the importance of healthy living behaviors (PHBS).

### **Exclusive Breastfeeding**

From the results of the literature review, it was found that there was a significant correlation between exclusive breastfeeding and the risk of ari incidence in toddlers. Lack of maternal knowledge in exclusive breastfeeding where exclusive breastfeeding is not given properly for various reasons so toddlers are given formula milk or other foods as a substitute for exclusive breastfeeding.

Toddlers who get exclusive breastfeeding are less likely to be exposed to ARI. Colostrum contained in breast milk contains many antibodies in respiratory tract infections and white blood cells, besides that it also contains vitamin A for protection from infections and allergies (Sabri et al, 2019). This also affects the nutritional status of toddlers which should be fulfilled properly. In other words, the pattern of breastfeeding is very influential with the risk of ari appearing in toddlers.

Lack of maternal knowledge in exclusive breastfeeding where exclusive breastfeeding is not given properly for various reasons so toddlers are given formula milk or other foods as a substitute for exclusive breastfeeding.

### **Immunization Status**

ARI disease can be prevented by immunization which is a risk factor due to complications from measles. The vaccine given will increase the immunity of the toddler. From the results of the review literature, a correlation was obtained between immunization status and the risk of the emergence of ARI events in toddlers. Fewer toddlers who already have complete immunization status are affected by ARI than those who have incomplete immunization status or even those who have not been immunized. Even though the toddler

has received a complete immunization, the toddler still has the possibility of developing ARI. This is due to the low immune system of the toddler due to the nutritional status that is not met or the pattern of breastfeeding by the toddler's mother.

### **Economic Status Conditions**

From the results of the review literature, it was found that families whose economic status was insufficient were more vulnerable to ARI than families whose economic status was sufficient. This is because the high cost of living and the cost of daily consumption that must be met make the emphasis on meeting consumption a minimum. The nutritional status of toddlers becomes insufficient because of this so toddler are prone to disease.

Income level is a factor that determines the quality and quantity of food that depends on the size of the family income (Nana and Tinah, 2012). Christi's research (2018) also said that limited economic status can also affect the risk of ari events due to cost constraints.

### **Differences in Breastfeeding Patterns**

#### **Exclusive Breastfeeding**

Exclusive breastfeeding is when babies are only breastfed from birth to 6 months of age without giving drinks and other foods, including water (except vitamin/mineral drops, medicines, and dairy milk are allowed).

#### **Predominant Breastfeeding**

Predominant breastfeeding is when babies are given breast milk during exclusive breastfeeding but have given a little water and drinks in the form of water, such as tea and water.

#### **Partial Breastfeeding**

Partial breastfeeding is when the baby is breastfed but also gives artificial food as a companion or substitute for breast milk, such as porridge and formula milk when the baby is before the age of 6 months by being given constantly or only as a prelacteal food.

### **Effect of Differences in Breastfeeding Patterns with Nutritional Status in Toddlers**

In breastfeeding pattern, there are 3 types of breastfeeding, Exclusive Breastfeeding, Predominant Breastfeeding, and Partial

Breastfeeding. Exclusive breastfeeding has a good effect on the nutritional status of toddlers, including it can affect children's motor development, and normal weight, and meet the needs for a more balanced nutritional intake (Muhammad Iqbal & Suharmanto, 2020). The protein content in exclusive breast milk is more optimal and is easily absorbed by the baby's digestion.

In predominant breastfeeding and partial breastfeeding, the baby but also providing other fluids and artificial food. Predominant breastfeeding adversely affects the nutritional status of toddlers, toddlers who often receive water can face several threats including jaundice, increased bilirubin in the body which causes water poisoning (oral water intoxication), low body temperature (hypothermia), seizures of sodium deficiency, malnutrition, slow growth, until it fails to grow (failure to thrive) because it is full of water and does not want to suckle (Fauziah et al., 2021).

Partial breastfeeding also adversely affects the nutritional status of toddlers, formula milk has a greater risk of obesity. In formula milk, there is a casein protein content that can stimulate Insulin Growth Factor 1 (IGF-1) which synergizes with anabolic hormones and has a proteolysis inhibition effect. Improper feeding at an early age will result in growth disorders, suffering from malnutrition such as Lack of Energy and Protein (KEP), because it does not contain balanced nutrition in fulfilling energy intake, micronutrients (vitamins and minerals), and protein (Nuzula & Anggari, 2019).

### **The Role of Breastfeeding Patterns in Increasing the Body Resistance of Toddlers to Infectious Diseases, Especially for ARI**

Theoretically, ARI is a disease that infects the respiratory tract, or upper and lower respiratory tract, and is transmitted through droplets and air transmission by some infectious agents (microbes) that enter the respiratory tract through inhalation in healthy toddlers. When the immune system is weakened, microbes can pass through defenses and attack the upper and lower respiratory tracts, this is what causes the appearance of symptoms of ARI.

Toddlers are more susceptible to infection than adults because the immune system is still not optimally developed. Therefore, toddlers must be given exclusive breastfeeding to support their immune system in quality and quantity, so that they

can meet the abundant nutritional needs of antibodies for the prevention of various types of infections and growth and development. Protective factors and nutrients that exclusive breastfeeding has can protect toddlers from the occurrence of ARI. Exclusive breast milk contains colostrum, which contains about 8 million cells and other nutrients such as 8.5% protein, 2.5% fat, 3.5% carbohydrates, 0.4% salts and minerals, and 85.1% water. Colostrum has a protective effect such as IgA (sIgA) as an inhibitor of microbial attachment to epithelial cells to prevent the entry of microorganisms into the blood through the gastrointestinal mucosa and activate antibodies in the respiratory tract. Lysozyme, which destroys bacteria; lactoferrin, which is bacteriostatic; and polypeptides (threonine), which prevent microorganisms from entering the respiratory tract and lungs. Cytokines that activate lymphocytes T and B. Oligosaccharides as the first step in infection to prevent microbial attachment to airway epithelial cells, and bronchially associated lymphoid tissue (BALT) and intestinal-associated lymphoid tissue (GALT) as respiratory antibodies (Ni Putu Eka Gloria Puspawan et al., 2021).

The pattern of breastfeeding with predominant breastfeeding and partial breastfeeding will have a bad impact on the occurrence of ARI. Predominant breastfeeding by giving water must be considered because it can cause illness in toddlers. This is related to the air source used. Many people use well water or commercially available water for daily cooking and cooking. Children are more susceptible to respiratory and digestive infections when the air they consume is contaminated. In addition, partial breastfeeding only partially receives additional nutrients from the food. Complementary foods or complementary foods that replace breast milk have an effect because complementary foods are not guaranteed to be free of germs and bacteria. Giving formula milk in a bottle increases the risk of disease in toddlers because of the vulnerability to the cleanliness of the bottle. Bottles that are not fast and even smelly are breeding grounds for bacteria. Washing bottles without clean soap can allow bacteria to breed, and improperly storing bottles can also cause bacteria to grow on bottles and nipples. In this case, germs and bacteria can enter the toddler's body which can cause ARI (Fauziah et al., 2021).

## 5 CONCLUSIONS

Based on the results of the literature review, it can be concluded that the incidence of ARI is influenced by several factors such as sex differences, birth history (BBLR), nutritional status condition, smoking habits, exclusive breastfeeding, immunization status, and economic status conditions. These various factors are interconnected and mutually support one factor over another.

One of the most influential factors in the incidence of ARI in toddlers is the pattern of breastfeeding. Toddlers are more susceptible to infection than adults because the immune system is still not optimally developed. Therefore, toddlers should be given exclusive breastfeeding to support their immune system in terms of quality and quantity, so that they can meet the abundant nutritional needs of antibodies for the prevention of various types of infections as well as for growth and development.

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