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The relationship of low birth weight with acute respiratory infection (ari) on toddlers in telaga health care clinic Of gorontalo distric

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ABSTRACT ARI is The most common Disease in Toddlers. The LBW baby often sustains respiratory disorders. The study is aimed the investigate the relationship between Low Birth Weight and Acute Respiratory Infection on toddlers in Telaga Health Care Clinic of Gorontalo District. The research is observational with Case-Control Study design retrospectively. The independent variable is low birth weight, and the independent variable is the ARI incident. The whole population is the entire 198 toddlers. The sample of 71 toddlers which diagnosed as ARI cases with purposive sampling technique employed who are not ARI patient were selected as control sample according to match age group (matching) criteria. The comparison of case-control is 1:2 so that entire sample is 59:118 =177 toddlers. The data analysis applied the Chi-Square Test and odd risk (OR). The correlation test result of chi-square obtained the value of x2 count = 38,854 and the p-value = 0,000, with the fulfillment hypothesis x2 count (38,854) is higher than x2 table (3,841) and the p-value (0,000) is lower than α (0,05) Conclusions: there is a relationship between Low Birth Weight and Acute Respiratory Infection (ARI) incidents in Toddlers in Telaga Health Care Clinic

Keywords: Low Birth Weight, Acute Respiratory Infection

1. PRELIMINARY

Acute Respiratory Infection (ARI) is an acute infection that attacks one part / more of the airways from the nose to the alveoli including the adnexanya (sinuses, middle ear cavity, pleura). This disease can attack the airways from the nose to the alveoli including adneksanya (sinuses, middle ear cavity, pleura). This disease is caused by bacteria or viruses that enter the respiratory tract and cause an inflammatory reaction (Ministry of Health RI, 2012).

Several factors that influence the incidence of ARI both directly and indirectly. Risk factors that cause ARI in children under five are socio-economic (income, housing, parental education), nutritional status, level of maternal knowledge and environmental factors (air quality). Factors that cause ARI in infants are low birth weight (LBW), poor nutritional status, incomplete immunization, density of dwellings and physical environment. Meta-analysis shows that LBW has a Risk Ratio (RR) of 6.4, meaning that the incidence of ARI in children with LBW is 6.4 times more often than in children who are not LBW (Chandrawati, 2014).

Birth weight determines physical and mental growth and development in infancy. Low birth weight has a greater risk of death than adequate birth weight, especially in the first months of birth, due to the formation of incomplete anti-immune substances that are more susceptible to infectious diseases, especially pneumonia and other respiratory diseases. Infants with LBW often experience respiratory problems. This is due to the incomplete growth and development of the lungs and weak respiratory muscles (Hayati, 2014).

The virus that most often causes ARI in infants is influenza-A, adenovirus, parainfluenza virus. The pathogenesis process is related to three main factors, namely the host immunity state, the type of microorganism that attacks the patient, and various factors that interact with each other. This infectious disease can attack all age groups, but babies, toddlers, and seniors are the most vulnerable to be infected with this disease (Ministry of Health RI, 2016).

ARI is a disease that often occurs in children. Incidence according to under-five age groups was estimated at 0.29 episodes per child / year in developing countries and 0.05 episodes per child / year in developed countries. This shows that there are 156 million new episodes in the world per year in which 151 million episodes (96.7%) occur in developing countries. Most cases occur in India (43 million), China (21 million) and Pakistan (10 million) and Bangladesh, Indonesia, Nigeria each of 6 million episodes. Of all cases that occur in the community, 7-13% of cases are severe and require hospital care. Cold symptoms in children under five in Indonesia are estimated to be 2-3 times per year (Rudan et al Bulletin WHO 2008). ARI is one of the main diseases with patient visits in Puskesmas by 40% -60% and hospital visits by 15% -30% (Ministry of Health RI, 2016).

According to Riskesdas data, the prevalence of ARI in Indonesia in 2013 was 25.0%. This figure is not much different from the results of Riskesdas 2007 which is 25.5%. The prevalence calculated is the period of ARI prevalence which is calculated in the past 1 month. In 2013, the five provinces with the highest ARI prevalence were East Nusa Tenggara (41.7%), Papua (31.1%), Aceh (30.0%), West Nusa Tenggara (28.3%) and East Java (28 , 3%). Gorontalo Province itself is in the 20th position out of 33 provinces in Indonesia in the order of the highest prevalence of ARI with a percentage of 23.2%.

ARI Case Prevalence in Gorontalo Province in 2016 recorded 23,740 cases of ARI in infants. In 2017, there were 17,901 cases of ARI in infants. Meanwhile, the ARI Case that occurred in Gorontalo District in 2016 was the highest 7,292 cases in the order of Districts / Cities in Gorontalo Province. In 2017, the prevalence of ARI was 6,719 cases, still ranked first in Gorontalo Regency / City (Dikes of Gorontalo Province, 2017).

Meanwhile, the prevalence of low birth weight babies (LBW) in Gorontalo Province continues to increase from year to year. Recorded in 2015 there were 718 babies with LBW, whereas in 2016, there were 935 LBW babies out of 20,448 babies born. the whole baby was referred to get further treatment at the Hospital (BPS Gorontalo Province, 2018).

A preliminary study conducted at the Telaga Health Center in Gorontalo District obtained data that in 2016, ARI was the fifth disease in the top 10 prominent diseases with 729 cases. In 2017, cases of ARI were the third most common disease in 971 cases. Meanwhile, until the end of February 2018, there were 71 cases of under-five children with ARI (PKM Telaga, 2018).

The preliminary study showed that at the Telaga Health Center the incidence of ARI was still high. Based on the description and the data, the researcher was interested in carrying out the research with the title "*The Relationship of Low Birth Weight with the Occurrence of Acute Respiratory Infections (ARI) in Toddlers in the Telaga Health Center of Gorontalo District".*

2. RESEARCH METHODS

An observational study with a case control study to study how large the incidence of low birth weight was associated with the incidence of ARI in infants with a retrospective approach. Matching in this study is the same age group (Notoatmodjo, 2012).

The population is all toddlers who conduct inspection visits at the Telaga Health Center in January-February 2018 totaling 198 toddlers. Purposive Sampling retrieval techniques. Toddlers who have been diagnosed with ARI in accordance with the Integrated Management of Toddlers' Illness register (IMCI) until February 2018, as many as 59 toddlers are used as cases, calculated by Slovin formula. The comparison of case-control used is 1: 2 so that the total sample size is 59: 118 = 177 toddlers

The instrument used was the observation sheet to determine the incidence of LBW and ARI in infants used as samples

Primary data in this study is data obtained directly through observation sheets used by researchers. Secondary data in the form of IMCI registers and literature on books, articles, journals and other data related to research

The analysis used is univariate and bivariate. Data analysis used is Chi-Square Test (Kai-Square Test). Furthermore, the odds ratio (OR) statistical test was conducted to determine the extent of LBW incidence as a risk factor for ARI cases in infants

2.1 Research result

2.1.1 Univariate analysis

2.1.1.1 Weight of Toddlers Birth at Telaga

Health Center, Gorontalo District

Table 1. Weight of Toddlers Birth at Telaga Health Center Gorontalo District

Birth Weight for Toddlers	Frequency	%
LBW (<2500 gram)	54	30,5
Not LBW (>=2500 gram)	123	69,5
Total	177	100

Source: Primary Data, 2018

Based on the table, it can be seen that in Telaga Health Center, toddlers born with low birth weight (<2500 grams) were 54 people (30.5%) and 123 were born normal or not LBW (> 2500 grams) (69.5 %).

2.1.1.2 ARI Occurrence in Toddlers at Telaga Public Health Center, Gorontalo District

Table 2. ARI Occurrence in Toddlers at Telaga Public Health Center Gorontalo District

ARI Occurrence in Toddlers	Frequency	%
ARI	59	33,3
Not ARI	118	66,7

Total	177	100

Source: Primary Data, 2018

Based on the table, it can be seen that in Telaga Public Health Center, Gorontalo District, toddlers who experienced ARI were 59 toddlers (33.3%) and not ARI as many as 118 toddlers (66.7%).

2.1.2 Bivariate analysis

Bivariate analysis was conducted to determine the relationship of Low Birth Weight with the incidence of Acute Respiratory Infection in infants in Telaga Health Center.

Table 3. Relation of Low Birth Weight with Acute Respiratory Infection Occurrence in toddlers at Telaga Health Center

LBW	ARI event				Total		χ^2 count ρ value OR
	ARI		Not ARI				
	n	%	n	%	n	%	
LBW	36	20,3	18	10,2	54	30,5	38,854 0,000 8,696
Not LBW	23	13,0	100	56,5	123	69,5	
Total	59	33,3	118	66,7	177	100	

Source: Primary Data, 2018

Based on the table it can be seen that out of 59 toddlers (33.3%) who had ARI, 36 toddlers (20.3%) were born with low birth weight (LBW) and 23 toddlers (13.0%) were born with weight normal birth (not LBW). Meanwhile for 118 toddlers (66.7%) who did not experience ARI, 18 children under five (10.2%) were born with low birth weight (LBW) and 23 children under five (56.5%) were born with normal birth weight (not LBW).

Based on the results of the chi square correlation test obtained the value of $\chi 2$ count = 38,854 and the value of ρ = 0,000, with the fulfillment of the hypothesis $\chi 2$ count (38,854)> tabel2 tables (3,841) and the value of ρ (0,000) <α (0,05) can be interpreted there is a relationship Low Birth Weight with the incidence of Acute Respiratory Infection in toddlers at the Telaga Health Center. The odd risk (OR) value was 8.696, which means that toddlers who were born with low weight 8,696 times were more at risk of developing ARI compared to babies born with normal weight.

3. DISCUSSION

3.1 Weight of Toddlers Birth at Telaga Health Center Gorontalo District

The results showed that in Telaga Public Health Center, children born with LBW category (<2500 grams) were 54 people (30.5%) and those who were normal or not LBW (> 2500 grams) were 123 toddlers (69.5%).

According to the researchers this was due to the nutritional factors contained in the food consumed by mothers during previous pregnancies. With a lack of nutritional intake, the nutrients received by the baby are also reduced which can eventually lead to malnutrition in the baby and born with a low birth weight. The lack of nutrition is caused by economic factors and factors of the mother herself. Economic factors that are lacking from the family cause the family's inability to provide foods that are highly nutritious for the mother. The mother's own factor is the occurrence of continuous vomiting as a result of pregnancy which causes the nutrient content in the food cannot be absorbed properly by the mother's body.

Rusli, Suhartatik, et al (2012), defining low birth weight babies (LBW) are newborns whose birth weight at birth is less than 2500 grams. In 1961 by WHO all newborns with birth weight less than 2500 grams were called Low Birth Weight Infants (LBW). In the past, neonates with birth weight less than 2500 grams or equal to 2500 grams were called premature.

Infants born with low body weight, will get several kinds of complications including hypotension, hypoglycemia, intracranial hemorrhage, and some diseases that will be suffered in the development of growth (Proverawati, 2012).

In line with the theory that low birth weight babies (LBW) are newborns whose birth weight at birth is less than 2500 grams. One of the causes of LBW births is behavioral and environmental risk factors including poor nutritional status, alcohol consumption, and drug consumption as well as during pregnancy exposure to cigarette smoke (Rusli 2012).

The factors that influence the occurrence of LBW are often occur in preterm birth, because gestational age is less than 37 weeks where body weight is lower than it should be. Maternal factors such as poor nutrition during pregnancy, the distance of pregnancy and childbirth are too close, a history of suffering from chronic diseases, including the consequences of drugs (which are not according to the advice of the doctor / midwife) consumed by the mother during pregnancy, mother smoker, maternal age <20 years and > 35 years, the pregnancy distance is less than 2 years, the mother suffers from certain diseases (hypertension, heart disease, malnutrition, anemia, infection in the uterus, uterine and placental factors), and overwork and pregnancy between multiple pregnancies, antepartum hemorrhage, and pregnancy complications are also a factor that causes LBW to be born (Manuaba, 2010).

Birth weight determines physical and mental growth and development in infancy. Low birth weight has a greater risk of death than adequate birth weight, especially in the first months of birth, due to the formation of incomplete anti-immune substances that are more susceptible to infectious diseases, especially pneumonia and other respiratory diseases. Infants with LBW often experience respiratory problems such as ARI. This is due to the incomplete growth and development of the lungs and weak respiratory muscles (Hayati, 2014).

The results obtained in this study are similar to the results obtained by Astuti (2011) where in 2011 in the Regional General Hospital of Yusud Sheikh Gowa District from 1661 the number of babies born among them 239 babies were LBW and there were around 59 babies who died after birth then the number of babies born with normal weight is 1422 babies.

Likewise, research conducted by Fitri (2017) found that from 75 children under five in Lima Puluh Pekan Baru Health Center there were 22 children under five (29.3%) who had LBW and 53 babies (70.7%) were born normal.

3.2 Ari occurrence in toddlers at telaga public health center, gorontalo district

Based on the results of research at Telaga Health Center, toddlers who experienced ARI were 59 toddlers (33.3%) and not ARI as many as 118 toddlers (66.7%).

According to researchers the occurrence of ARI in infants in Telaga Health Center is influenced by several factors. Several recent studies and studies still show evidence that risk factors for ARI are LBW factors, malnutrition and non-compliance with immunization which are still the causes of toddlers more susceptible to infection. As a result of low birth weight toddlers experience growth and maturation (malturation) organs and organs that are not perfect and the respiratory center in the medulla is not yet mature, which means toddlers have a greater risk of ARI, plus other factors such as poor nutritional status and immunization disobedience which causes the formation of the immune system in the body is less than perfect so that the body will be more susceptible to infection causing the disease.

Acute Respiratory Infection (ARI) is an acute infection that attacks one part / more of the airways from the nose to the alveoli including the adnexanya (sinuses, middle ear cavity, pleura). This disease can attack the airways from the nose to the alveoli including adneksanya (sinuses, middle ear cavity, pleura). This disease is caused by bacteria or viruses that enter the respiratory tract and cause an inflammatory reaction (Ministry of Health RI, 2012).

The virus that most often causes ARI in infants is influenza-A, adenovirus, parainfluenza virus. The pathogenesis process is related to three main factors, namely the host immunity state,

the type of microorganism that attacks the patient, and various factors that interact with each other. This infectious disease can attack all age groups, but infants, toddlers, and seniors are the most vulnerable to be infected with this disease (Ministry of Health RI, 2016).

A cold cough is an infectious upper respiratory infection that can be transmitted through coughing, sneezing, and unwashed hands that have been in contact with nasal or oral fluids. ARI can cause swelling of the tonsils that have edema and red color, sore throat, pain when swallowing, high fever and white gray exudates on the tonsils, in addition to an abscess on the tonsils (Taufan, 2010).

The results obtained in this study are almost similar to the results obtained by Husin (2014) who obtained the results that in Yogyakarta Wirobrajan Health Center, toddlers who experienced ARI at 60% and not ARI at 40%. Meanwhile research from Desiyana (2017) in the Working Area of Palm Oil Puskesmas across the Sawit District across Langkat District in 2017 found that there were 43 cases of ARI in children under five (47.8%) out of 90 toddlers.

3.3 Relationship of low birth weight with the incidence of acute respiratory infection in infants in telaga health center

Chi square correlation test obtained the value of $\chi 2$ count = 38.854 and the value of ρ = 0.000, with the fulfillment of the hypothesis $\chi 2$ count (38.854)> tabel2 tables (3.841) and the value of ρ (0.000) $<\alpha$ (0.05) can be interpreted there is a relationship of body weight Low Birth with the incidence of Acute Respiratory Infection in toddlers at Telaga Health Center. The odd risk (OR) value was 8.696, which means that toddlers who were born with low weight 8,696 times were more at risk of developing ARI compared to babies born with normal weight.

According to researchers there is a relationship between LBW and ARI because in infants with LBW, the organs of the body have not developed perfectly at birth so that in their growth and development the child will often experience organ disturbance and immaturity. The formation of anti-immune substances in the body of children who experience LBW will be disrupted so that children will be susceptible to infectious diseases, especially pain in the respiratory tract.

Theoretically low birth weight babies are more susceptible to infection than babies with normal birth weight babies. Low birth weight babies (LBW) have a greater risk of death compared to normal birth weight, especially in the first months of birth because of the incomplete formation of anti-immunity substances that are more susceptible to infectious diseases, especially pneumonia and other respiratory diseases (Maryunani, 2010).

In line with the theory of Pio et al (2005) in Haryanti (2014) that birth weight determines growth and physical and mental development in infancy. Babies born under normal weight are called LBW (infant weight <2500 grams). LBW infants are susceptible to ARD, because infants with LBW have a low body defense system against pathogenic microorganisms. With only mild infections it is enough to make you sick, so LBW babies are vulnerable to infectious diseases including ARI.

Toddlers who experience LBW are more at risk for being diagnosed with ARI. Due to LBW toddlers, the respiratory organs are not yet mature which causes inadequate lung development, respiratory muscles are still weak and the respiratory center has not developed. The lack of surfactant substances can reduce stress on the lung surface. Anatomy of an immature respiratory organ causes rhythms of irregular breathing often found in apnea and cyanosis. Respiratory rate varies from 60 to 80 times per minute (Ibrahim, 2011).

The results obtained in this study are similar to the results obtained by Hariyanti (2014) who found that respondents who suffered from ARI were 8 people (53.3%) who were LBW and 13 respondents (86.7%) who are born with normal weight. The results of the chi square test analysis showed that there was a LBW relationship with the incidence of ARI in infants (p = 0,000) and toddlers who had LBW had a chance of 1.1 times suffering from ARI compared to infants who were born with normal weight.

Similarly, the results of research by Andarisma (2011) concerning the relationship between birth weight with ARI in infants in Depok Bhakti Yudha Hospital for January 2006-December 2010. The results showed that there was a significant relationship between birth weight and the

incidence of ARI and LBW infants having 2.3 times greater risk of developing ARI compared with babies born with normal weight.

4. CONCLUSION

Based on the research and discussion in the previous chapter, the conclusions are as follows:

4.1 At the Telaga Health Center, a small proportion of infants born under the LBW category (<2500 grams)

4.2 At the Telaga Health Center, a small proportion of children under five experience ARI

4.3 There is a relationship of Low Birth Weight with the incidence of Acute Respiratory Infection in infants in Telaga Health Center.

5. SUGGESTION

5.1 For researchers, it is possible to continue to develop knowledge and studies regarding the relationship or relationship between LBW and the incidence of ARI in infants. So that it can be a valuable provision in the future.

5.2 For Researchers Furthermore, presumably the results of this study can be used as additional literature for further researchers in reviewing and researching LBW as well as its relation to the incidence of ARI in infants with a wider scope

5.3 For Health care clinic, presumably the results of this study can be used as material for policy making in reducing the incidence of LBW and ARI in infants in the Puskesmas working area.

5.4 For the family, it is possible to continue to expand health insights so that it can improve the knowledge of children under five (parents) regarding the incidence of ARI and LBW and can be taken into consideration in preventing ARI.

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