

Nutritional Status of Children with and without Pneumonia

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Abstract—One of the highest disease of Acute Respiratory Infections (ARI) is pneumonia. Pneumonia is a lung infection caused by viruses or bacteria. There are several risk factors that can cause pneumonia, one of the factor is nutritional status. The Aim of this study was to find out the comparison of nutritional status of children with pneumonia and toddlers without pneumonia toddlers 1-5 years at Health center Garuda Bandung. Collecting secondary data, taken from health center of the medical record data, to see whether the patient has acute or chronic pneumonia. Primary data collection is carried out by doing anthropometric measurements consists of toddler age and weight by using standing body scales for children who can walk and sleeping scales for toddlers who have not been able to walk that have been calibrated. The instrument used to assess the nutritional status of children is a standard deviation (Z-score) with reference to the World Health Organization-National Center Health Statistic (WHO-NCHS), with categories of poor nutritional status, malnutrition, good nutrition, or over nutrition. Toddlers with malnutrition were 8 people consisting of 5 (7.8%) pneumonia and 3 (3.9%) not pneumonia. Toddlers with good nutritional status and more than 68 people consisted of 33 (42.1%) pneumonia and 35 (46%) not pneumonia, with $p = 0.711$. The nutritional status of children does not affect the incidence of pneumonia, there are other risk factors, namely smoking habits in the family.

Keywords—acute respiratory tract infection; smoking; pneumonia; standard deviation nutritional status (Z-score)

I. INTRODUCTION

Indonesia is one of the countries that signed the Millennium Development Goals (MDGs) development goals is committed to improving the quality of human resources and a better quality of life in 2015. Acute Respiratory Infection (ISPA) or Acute Respiratory Infections (ARI) is one of the highest causes of child mortality in the world, with 50% of deaths occurring in 2007-2014 caused by Pneumonia [1]. In Indonesia, the number of pneumonia in children reaches 554,650 cases or 63.45%, with the highest number in Java West is 180,357 cases or about 20% [2]. Then from the results of the documentation study at the Garuda Health Center, there were 2346 cases of pneumonia case reports from 2013-2016 or around 45%.

Pneumonia is an acute lower respiratory tract infection (ISNB) with symptoms of coughing and accompanied by shortness of breath caused by infectious agents such as viruses,

bacteria, mycoplasma (fungi), and foreign substance aspirations accompanied by exudation and consolidation [3]. Risk factors for pneumonia include nutritional status, breastfeeding, babies with low birth weight, gender and physical factors of the house [2]. Other research results suggest that poor nutritional status can cause toddlers to be more susceptible to lower airway disease [4]. According to the Ministry of Health poor nutritional status in children can make the child's immune system low, and eventually the child will be susceptible pneumonia [2].

Child mortality can be an indicator in determining the child's health status. Efforts to reduce child mortality are to encourage and mobilize all forms of health services to create excellent service [5]. Health centre as a form of leading health services has a role in reducing child mortality by taking into account the state of children's nutritional status [6].

Research conducted by Arianto and Nanda found that under-five children with nutritional status were not at high risk for pneumonia [7]. Other studies show a significant or significant relationship between the nutritional status of children with the degree of pneumonia in infants [7]. Given the impact of pneumonia on children is very bad and in terms of previous research there has been no research that specifically compares the nutritional status of children with pneumonia with children under five is not pneumonia.

II. METHOD

This research is a quantitative study with observational research with a cross sectional approach, to assess the role of risk factors in the effect of effect A or effect B. In this study, researchers will conduct direct observation on toddlers aged 1-5 years diagnosed with pneumonia (effect A) and not pneumonia (effect B) in a certain susceptible time, then the researcher will observe the independent factors related to the nutritional status of children with pneumonia and not pneumonia.

The population in this study were all toddlers aged 1-5 years who had pneumonia and not pneumonia who came to the Garuda Health Center in 2017. The samples in this study were toddlers with pneumonia and not pneumonia aged 1-5 years who came to Garuda Health Center in April - June 2017.

Collection of secondary data, taken from Health center Garuda Bandung medical record data, to see whether the patient has acute or chronic pneumonia. Primary data collection is carried out by doing anthropometric measurements consisting of toddler age and weight by using standing body scales for children who can walk and sleeping scales for toddlers who have not been able to walk that have been calibrated.

The instrument used to assess the nutritional status of children is a standard deviation (Z-score) with a reference to the World Health Organization-National Center Health Statistic (WHO-NCHS), which consists of poor nutritional status, malnutrition, good nutrition, or over nutrition.

Data analysis uses univariate analysis to describe the frequency distribution and the proportion of each variable. Bivariate analysis uses chi-square test because the type of data collected is ordinal. Significance test is done by using a significance level of 95% or a value of $\alpha = 0.05$ (5%) with the provision that if the value of $p \leq \alpha$ (0.05) then H_0 is rejected, which is statistically interpreted as the difference and if the value of $p > \alpha$ (0.05) then H_0 failed to be rejected, namely statistically interpreted as no difference.

III. RESULTS

Characteristics of respondents showed that 38 toddlers with pneumonia consisted of toddlers (12-36 months) 24 people (31.5%), preschool (37-60 months) 14 people (18.5%) while from 38 toddlers who were not pneumonia consisted from toddler 25 (32.9%) and preschool 13 (17.1%). Frequency distribution of sex of children under five who were pneumonia, 21 (27.6%) male sex, and 17 (22.4%) female sex. Whereas 20 (26.2%) toddlers who were not pneumonia were men and 18 (23.8%) were women.

Distribution of Frequency of Pneumonia and No Nutritional Status of Toddlers

Pneumonia at Health center Garuda Bandung (N = 76)

A description of the frequency distribution of the state of nutritional status in under-five children with pneumonia from 38 toddlers diagnosed with pneumonia, as many as 0 children with poor nutritional status, 5 (13.2%) with poor nutritional status, 32 (84.2%) with good nutritional status and 1 (2.6%) with more nutritional status. In addition to children under five who were not diagnosed with pneumonia, there were 0 children under five with a diagnosis of malnutrition, 3 (7.9%) with poor nutritional status, 35 (92.1%) with good nutritional status, and 0 toddlers with nutritional status more.

Comparative Study of 1-5 Years of Toddler Nutrition Status with Pneumonia and No Pneumonia at Garuda Bandung Health Center (N = 76).

From the results of bivariate analysis, there were 8 children under five with low nutritional status, consisting of 5 (7.8%) toddlers with pneumonia and 3 (3.9%) toddlers with no pneumonia. Then there were 68 children with good nutritional status and consisting of 33 (42.1%) children with pneumonia and 35 (46%) children without pneumonia.

From the calculation using statistical tests produce $p > 0.05$ with a significance value of $p = 0.711$, so it can be concluded that H_0 failed to be rejected. This means that there is no significant difference between the nutritional status of children with pneumonia and not pneumonia.

IV. DISCUSSION

A. Nutrition Status of Children Under Five Years Old

Nutrition status of children under five years old from the data above, it can be is good nutritional status, but suffering from pneumonia. The opinion of the Ministry of Health that nutritional status factors are not the main cause of pneumonia, there are other factors, namely the physical environment of children under five which can affect the health and illness of infants [2].

Toddlers with good nutrition can get pneumonia because of other risk factors such as low birth weight babies, inadequate breastfeeding, indoor air pollution, dense settlements, chronic diseases, iatrogenic factors, trauma during anesthesia, aspiration and antibiotic treatment that are not perfect [8].

In line with the research conducted by Sugihartono and Nurjazuli, the results of $p = 0.002$, which means there is a relationship between family smoking habits at home and the incidence of pneumonia in infants [9]. In addition, cigarette smoke that pollutes the house continuously can ultimately weaken the body's resistance, especially infants and toddlers so that it will be more susceptible to disease.

Different according to Wong nutritional assessment or children's nutritional status is the most important part of assessing health in its entirety [10]. There is also the purpose of assessing nutritional status is to evaluate the nutritional status of children, the status can identify the balance between income and use or nutrient requirements. In addition, according to Azwar toddlers is a critical period [7], where balanced nutritional needs at that age are very important, because at the age of five is a golden period for optimal brain growth and development.

Some studies report that malnutrition will reduce immune capacity to respond to pneumonia infections including impaired granulocyte function, decrease in complement function, and also cause micronutrient deficiencies [11]. Decreasing micro substances in the body of a toddler will cause a decrease in serum retinol levels of less than 20mcg / 100ml which has an impact on the decline of the toddler's immune system, which in turn can increase the incidence of infections in toddlers [7].

B. Incidence of Pneumonia and Not Pneumonia

In this study from 38 toddlers who were not with pneumonia, 12 (31.6%) were found with a diagnosis of febrile rather than dengue and not malaria, then 19 (50%) with a diagnosis of cough not pneumonia, 1 (2.6%) toddlers with a diagnosis of otitis media, 1 (2.6%) toddlers with a diagnosis of dermatitis, 2 (5.3%) with a diagnosis of diarrhea, 2 (5.3%) with a diagnosis of constipation, and 1 (5.3%) toddlers with a diagnosis of conjunctivitis. From these results the highest rate

of non-pneumonia is coughing not pneumonia. At the diagnosis of cough not pneumonia, common symptoms that appear in toddlers include common cold, influenza and sinusitis.

Pneumonia is the most common lung infection often caused by viruses or bacteria. This infection is generally transmitted through direct contact with an infected person [12]. In addition, according to Wong's et al pneumonia will usually more often affect infants or children under five years [10]. Furthermore, from the survey results toddlers under the age of five who experienced pneumonia amounted to 63.45% or 554,650 cases in 2015 [1]. This is reinforced according to WHO that pneumonia contributes the highest number of under-five mortality, namely 16% or 920,136 toddlers in the world [1].

Furthermore, the percentage of children with pneumonia and not pneumonia reached 49 (64.5%) in the distribution of toddler age or 1-3 years, then 27 (35.5%) was in the preschool age distribution or 3-5 years of age. In this study all toddlers who had pneumonia and not pneumonia at the toddler age were the highest age compared to preschool age.

According to Wong et al pneumonia will more often attack toddlers, this is because the immune system of early children has not been formed perfectly, besides the vulnerability in older children will be lower than in early childhood [10]. This opinion was corroborated by research conducted by Nurnajiah, Rusdi and Desmawati in the study that the results showed that toddlers with a diagnosis of pneumonia were more commonly found in the age range of 13-28 months [13], this was in accordance with the results of Riskesdas that toddlers the highest pneumonia sufferers are found in infants aged 12-36 months [14]. So in this case further monitoring and management for this age needs to be done.

In addition, the percentage of toddlers of male who have pneumonia and not pneumonia is 41 (53.9%) and the number of female who have pneumonia and not pneumonia is 35 (46.1%), it can be concluded that toddlers with male sex men have a higher percentage of pneumonia and not pneumonia. From these results it can be concluded that the incidence of pneumonia is more prevalent in infants with male sex. This is in accordance with the research conducted by Sugihartono and Nurnazuli that the incidence of pneumonia is more prevalent among infants with male sex, except that after analysis there was no relationship between sex and the incidence of pneumonia [9]. According to the Ministry of Health the immune status of infants is not influenced by gender, but the factors are genetic, age, metabolic, environmental and nutritional [2].

C. Comparison of Nutritional Status with Pneumonia and Not Pneumonia

Referring to table 4.1, it is shown that toddlers with a diagnosis of pneumonia are more likely to have good nutritional status than children under five years old who do not have pneumonia. This is not in accordance with a study conducted by Gozali which states that toddlers with poor nutritional status will be vulnerable to pneumonia [15].

According to Wong's identifying the strength of nutritional intake in infants is very important, this can be done by

detecting the growth of children by looking at growth standards according to WHO [4].

According to the Indonesian Ministry of Health the risk factors for pneumonia are not entirely due to only one factor, other risk factors include non-exclusive breastfeeding, a history of toddlers with low birth weight, no ventilation at home, family members who smoke, and not doing DPT immunization and measles in infants [2].

Because there are several factors that can cause pneumonia, in this study researchers also tried to describe other risk factors apart from the state of nutritional status. These factors are measured using a questionnaire given to parents of toddlers who deliver toddlers to the Garuda Bandung Health Center.

The first risk factor is exclusive breastfeeding. After the analysis there was no significant relationship between breastfeeding not exclusive with the incidence of pneumonia children under five years old in Garuda Bandung Health Center. The results of this study are different from the research conducted by Sugihartono and Nurnajuli in a study conducted with a case control method and the results obtained there was a relationship between the history of breastfeeding and the incidence of pneumonia in infants [9]. Besides According to Pollar breastfeeding exclusively reduce the risk of respiratory infections, diarrhea, atopic dermatitis, asthma, diabetes, leukemia and sudden infant death [16].

Another risk factor for measurement is a history of low birth weight in children under five who have pneumonia and not pneumonia. The results were obtained there was no correlation between the history of low birth weight and the incidence of pneumonia children under five years old in the Garuda Bandung Health Center. The method used was case control and the results showed that there was a relationship between toddlers and a history of low birth weight with upper respiratory tract infection, including toddler pneumonia.

In addition, according to him in infants with Low Birth Weight, the body's resistance to infection is very low and the growth and development of the body and slow so that the child is easy to be affected for upper respiratory tract infection disease.

The next risk factor is ventilation at home. The results were obtained there was no relationship ventilation with the incidence of toddler pneumonia in the Garuda Bandung Puskesmas. These results are different from the research conducted by Sugihartono and Nurjazuli in the study that obtained significant results, namely there is a relationship of ventilation at home with the incidence of pneumonia under five years old [9]. In addition, according to Mubarak and Chayatin the unavailability of ventilation at home causes the room to become moist so that it can increase the development of microorganisms [17].

Furthermore, the measured risk factor is the presence of family members who smoke. The results obtained there is a relationship between smoking habits of family members with the incidence of pneumonia under five in the Garuda Bandung Health Center. According to Sugihartono and Nurnazuli the elements in cigarettes have stickiness and can stick to the lungs

which finally it can disrupt the gas exchange process in the lungs [9].

Other adverse effects of carbon monoxide contained in cigarettes can bind hemoglobin in the blood, this causes blood to be unable to bind oxygen, therefore the child will suffer from pneumonia. In addition, this is in accordance with the research conducted by Annah, Nawi and Ansar in his study as many as 73.9% of pneumonia toddlers have families who smoke inside the house [18]. In his research it can be concluded that toddlers who have family members in their homes or around toddlers have 5 times higher risk than not having family members who smoke.

In addition, referring to the percentage rate of non-pneumonia disease in infants it can be seen that the highest rate that occurs is coughing not pneumonia. In most cases that occur, the signs that appear in infants with non-pneumonia cough are sinusitis and the presence of influenza can be said that these toddlers experience upper respiratory tract infection. This is in accordance with the research conducted by Milo, Ismanto and Kalo that smoking habits of family members at home can increase the incidence of upper respiratory tract infection in infants aged 1-5 years [19]. In addition, according to WHO the incidence of pneumonia can originate from influenza disease, it can be concluded that in children under five years old who experience non-pneumonia cough they have a high risk of pneumonia if there is no further treatment [12].

The last measured risk factor was DPT and measles immunization status. The results showed that there was a relationship between children under five years old who did not do DPT and measles immunization with the incidence of toddler pneumonia at the Garuda Bandung Health Center. This result is different from the results of a study conducted by Sugihartono and Nurjazuli in a study that obtained results that there was a significant correlation between immunization status and incidence of pneumonia in infants [9]. In addition, according to Fida and Maya immunization aims to activate the body's organs and then form an anti-substance [20].

From the results of this study it can be concluded that the hypothesis of this study is not proven and further studies need to be carried out in future studies. The results of this study there were no differences between the nutritional status of children with pneumonia and not pneumonia. The factors that influence the possibility are smoking habits as evidenced by the results of static analysis using the Pearson Chi-Square test obtained $p = 0.005$, which can be $p < 0.05$, family members who smoke have a significant relationship with the incidence of pneumonia, so in this case the status nutrition is not the main cause of the incidence of pneumonia in infants in the Garuda Bandung Puskesmas.

V. CONCLUSION

The conclusion of this study is that the nutritional status of children under five years old does not affect the incidence of pneumonia, there are other risk factors, namely smoking habits in the family.

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