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Risk Factors of Pneumonia in Toddler at South Atambua Public Health Center and Halilulik Public Health Center

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ABSTRACT

Pneumonia is the leading cause of death in toddlers worldwide, almost every day there are toddlers who die of pneumonia. Pneumonia not only occurs due to a direct cause but is also caused by various risk factors such as low birth weight, immunization status, history of exclusive breastfeeding and also smoking habits. The purpose of this study was to analyze factors related to the incidence of pneumonia in toddlers at the South Atambua Health Center and Halilulik Health Center in 2020. This type of research is quantitative analytical research that uses case control methods. The population in this study is all children under five years old consisting of a case population of 66 toddlers and a control population of 5,254 toddlers. The sample in this study amounted to 64 toddlers consisting of case samples and controls with each amounting to 32 samples taken at random. The results of the study were analyzed univariately and bivariately using the chi square test and determination of the odds ratio value. Based on the results of the study, it is known that there is a significant association between low birth weight (p = 0.039 and OR value of 5,870), history of exclusive breastfeeding (p = 0.023 and OR value = 3.695) and smoking habits of family members (p=0.021 and OR value=3,240) with the incidence of pneumonia in toddlers, while for immunization status there is no significant association to the incidence of pneumonia in toddlers as seen from the value of p = 0.426 and OR value = 2,778 on the incidence of pneumonia in children under five. To avoid various health problems in toddlers, parents and health workers are expected to play an active role in paying attention to the health of toddlers so that toddlers can avoid various infectious diseases, especially pneumonia.
Keywords: pneumonia; risk factors; toddler

ABSTRAK

Pneumonia merupakan penyebab utama kematian pada balita di seluruh dunia, hampir setiap harinya terdapat balita yang meninggal karena pneumonia. Pneumonia tidak hanya terjadi karena penyebab langsung tetapi juga disebabkan oleh berbagai faktor risiko seperti berat badan lahir rendah, status imunisasi, riwayat pemberian ASI ekslusif dan juga kebiasaan merokok. Tujuan dari penelitian untuk menganalisis faktor yang berhubungan dengan kejadian pneumonia pada balita di Puskesmas Atambua Selatan dan Puskesmas Halilulik tahun 2020. Jenis penelitian analitik kuantitatif dengan metode *case control*. Populasi adalah semua anak usia di bawah lima tahun yang terdiri atas populasi kasus yaitu berjumlah sebanyak 66 balita dan populasi kontrol sebanyak 5.254 balita. Sampel kasus dan kontrol dengan perbandingan 1:1 dengan total 64 sampel, yang diambil secara acak. Hasil penelitian dianalisis secara univariat dan bivariat menggunakan uji *chi square* dan penentuan nilai *odds ratio*. Berdasarkan hasil penelitian diketahui bahwa terdapat hubungan yang signifikan antara berat badan lahir rendah (p = 0,039 dan nilai OR sebesar 5,870), riwayat pemberian ASI ekslusif (p = 0,023 dan nilai OR = 3,695) dan kebiasaan merokok anggota keluarga (p = 0,021 dan nilai OR = 3,240) dengan kejadian pneumonia pada balita, sedangkan untuk status imunisasi tidak terdapat hubungan yang signifikan dengan kejadian pneumonia pada balita, dilihat dari nilai p = 0,426 dan nilai OR = 2,778. Saran untuk orang tua balita dan petugas kesehatan diharapkan berperan aktif dalam memperhatikan kesehatan balita sehingga balita dapat terhindar dari penyakit pneumonia.
Kata kunci: pneumonia; faktor risiko,balita

INTRODUCTION

Pneumonia is an infectious disease that attacks lung tissue caused by several microorganisms, namely bacteria, viruses, and fungi. Pneumonia is the leading cause of death in toddlers worldwide and accounts for 15% of all deaths in children under the age of 5, leading to the deaths of 808.000 children in 2017. [(1)]

The number of pneumonia incidents in Indonesia according to ISPA Surveillance Subdit data in 2019 amounted to 468,442 cases covering the age of < 1 year 153,987 cases and for ages 1-5 years amounted to 314,455 cases. In the period 2016 to 2020, there were reportedly 3,770 infants and toddlers in Indonesia who died from pneumonia. The scope of pneumonia discovery in 2016 to 2018 increased based on the completeness of reporting from 94.12% in 2016 to 97.30% in 2017, and then increased to 100% in 2018. [(2)]

District/City Health Profile in NTT Province shows the scope of pneumonia discovery and treatment in toddlers experienced fluctuations from 2017-2019. In 2017 there were 6,059 cases (9.99%), in 2018 3,529 cases (33.4%) and in 2019 5,607 cases (24.72%). This means that there has been a decrease in the discovery and treatment of pneumonia sufferers in 2019. Belu Regency is one of the contributors to pneumonia cases in NTT Province. [(3)] Cases of pneumonia in toddlers in Belu Regency in 2019 amounted to 103 cases, with South Atambua Health Center as the Health Center with the highest pneumonia cases of 35 cases, and then followed by Halilulik Health Center as the health center with the second highest number of cases, which amounted to 31 cases from 17 health centers in Belu Regency. Still high cases of pneumonia in Belu Regency are caused by community behavior that is not in accordance with health rules and community characteristics. [(4)]

Toddlers (under five years old) is an age that is in an important period of growth and development of children and is also known as the golden age, children of toddler age are still completely dependent on parents, so parents need to pay more attention to children under five. Toddlers are the age group that is most susceptible to the incidence of diseases, especially infectious diseases, this is because the immune system is still weak and some parts of his organs are not functioning properly.

Toddlers are susceptible to pneumonia not only because of direct causative factors but also caused by risk factors, namely both intrinsic risk factors that run from inside the toddler's body and extrinsic risk factors that run from outside the toddler's body. Intrinsic risk factors include age children under five, gender, low birth weight, immunization status, exclusive breastfeeding, vitamin A and nutritional status and extrinsic risk factors include residential density, type of house, ventilation, type of floor, lighting, humidity, type of fuel, family income, maternal age, mother's knowledge and the presence of a family who smokes. [(5)] Research conducted by (Rigustia et al) states that factors related to the incidence of pneumonia in toddlers are exclusive breastfeeding, history of measles immunization, DPT, Hib, and the work of the toddler's mother. [(6)] Exclusive breast milk has an important role in boosting a person's immune system. This is because in breast milk there is a nutritional content that can increase a person's immune system so that it can prevent infectious diseases such as pneumonia. Immunization is part of prevention efforts to actively boost the immune system against a disease so that if exposed to the disease a person is not sick or will only experience mild pain. [(7)]

Toddlers with low birth weight (BBLR), causing anti-immune substances are less perfect so that the risk of infectious diseases, especially pneumonia, so that the risk of death becomes greater compared

to normal birth weight children. [8] Based on research conducted by Sary it is known that the smoking habit of family members in the house is the most influential risk factor for the incidence of pneumonia in toddlers. [9] The purpose of this study was to analyze the relationship between weight, history of excluive breastfeeding, immunization status and smoking habits of family members with the incidence of pneumonia in toddler in South Atambua Health Center and Halilulik Health Center in Belu Regency.

METHOD

This research uses quantitative analytical research design with *case control methods*. The research was conductet at the South Atambua Health Center and Halilulik Health Center located in Belu Regency in March-May 2021. The population of this study consists of case population and control population. The case population is all toddlers who have pneumonia, which is 66 toddlers and the control population is all toddlers who do not have pneumonia, which is 5.245 toddlers. This research sample also consists of case samples and control samples, the sample size is 32 for each case sample and control so that the total sample is 64. The sampling technique used in this study was randomly simple by using a random number table in the sample capture. The sample was taken based on inclusion criteria such as toddler mothers who are willing to be respondents, are at the location when visited and have KIA books. To obtain data during the study, the way is done is by interviews and observations, while the instruments used in retrieving data are questionnaire instruments and hand phone cameras for documentation. The technique of data analysis to find out results research is to use the chi-square test and determination the value of the odds ratio to see the results of univariate and bivariate data analysis. The variables in this study consist of free variables and bound variables. Free variables are birth weight, history of exclusive breastfeeding, immunization status and smoking habits of family members, while for bound variables is the incidence of pneumonia. This research has received ethical approval from the Health Research Ethics Commission of the Faculty of Public Health, University of Nusa Cendana with an ethical number: 2020231-KEPK.

RESULTS AND DISCUSSIONS

1. Characteristics of Respondent

Based on the results, it is known that of 64 total respondents it is known that the highest maternal age is the age of 24-28 years, which is 19 (30%) respondents and the lowest maternal age is 44-48 years old, which is 2 (3%) respondents, the highest maternal education is elementary school which is 18 (28%) respondents and high school 18 (/28%) respondents and the lowest education is DIII / DIV / S1 which is 13 (20%) respondents, And the highest maternal occupation was IRT which was 56 (87.5%) respondents and the lowest occupation was civil servants and nurses which was 1 (1.5%). For more details, you can see table 1.

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Table 1. Characteristics of respondents according to maternal age, education and maternal work in South Atambua Public Health Center and Public Halilulik Health Center in 2021

Characteristics of Respondents	n = 64	f (%)
Mother's Age (Years old)		
19-23	8	13
24-28	19	30
29-33	15	23
34-38	13	20
39-43	4	6
44-48	2	3
>48	3	5
Education		
Primary School	18	28
Junior High School	15	15
Senior High School	18	28
Diploma and Bachelor	13	13
Work		
Housewife	56	87,5
Civil Servant	1	1,5
Nurse/Midwife/Doctor/ Public health experts	1	1,5
Teacher	3	4,7
Others (Shop Assistants/Employees)	3	4,7

2. Characteristics of Toddlers

Based on the results of the interview it is known that the highest age of toddlers is 12-59 months, which is 53 (82.8%) respondents and the lowest age is the age of < 12 months, which is as much as 11 (17.2%) respondents, Male sex was 43 (67.2%) respondents and female sex as many as 21 (32.8%) respondents (67.2%) and female sex as many as 21 respondents (32.8%), birth weight < 2500 grams as much as 10 (15.6%) respondents and weight and weight 2500-4000 grams as much as 54 (84.4%) respondents, toddlers with exclusive breast milk as many as 37 (57.8%) respondents and toddlers who do not get exclusive breast milk are as many as 27 (42.2%) respondents, complete immunization status as many as 57 (89.1%) respondents and those who do not get complete immunization is as much as 7 (10.9%) respondents and family members who have a habit of smoking are as many as 48 (75%) respondents and family members who do not have a smoking habit is as much as 16 (25%) respondents. More can be found in table 2.

Table 2. Characteristics of toddlers by age, gender, birth weight, medical diagnosis, history of exclusive breastfeeding, immunization status and smoking habits of family members in South Atambua Public Health Center and Halilulik Public Health Center in 2021

Characteristics of Toddlers	n	%

Age of Toddlers		
<12 months	11	17.2
12-59 months	53	82,8
Gender		
Man	43	67,2
Woman	21	32,8
Medical Diagnosis		
Pneumonia	32	50
Not pneumonia.	32	50
Birth Weight		
<2500 grams	11	17,2
2500-4000 grams	53	82,8
Exclusive Breastfeeding History		
Not Exclusive breastfeeding	18	28,1
Exclusive breastfeeding	46	71,9
Immunisation Status		
Incomplete	7	10,9
Complete	57	89,1
Smoking Habits		
Having a smoking habit	47	75,4
Not having a smoking habit	17	25,6

Chi-square test results showed that there was a significant association between low birth weight (p = 0.020 < α 0.05 and OR = 5,870), a history of exclusive breastfeeding (p = 0.026 < α.05 and OR = 3,695), and smoking (p = 0.048 < α 0.05 and OR = 3,240) with the incidence of pneumonia, As for the immunization status variable there is no significant relationship (p = 0,246 > α 0.05 and OR = 2,778). More can be found in table 3.

Table 3. Distribution of birth weight relationship, history of exclusive breastfeeding, immunization status and smoking habits with the incidence of pneumonia in toddlers in South Atambua Public Health Center and Halilulik Public Health Center in 2021

Variable	Incidence of pneumonia						P	OR
	Case		Control		Total			
	n	%	n	%	n	%		
Birth Weight								
Low birth weight	9	28,1	2	6,2	11	100	0,020	5,870
Not low birth weight	23	71,9	30	93,8	53	100		
History of Exclusive Breastfeeding								
Not Exclusive breastfeeding	13	40,6	5	15,6	18	100	0,026	3,695
Exclusive breastfeeding	19	59,4	27	84,4	46	100		
Immunisation Status								
Incomplete	5	15,6	2	6,3	7	100	0,426	2,778
Complete	27	84,4	30	93,7	57	100		

Smoking Habits								
Having a smoking habit	27	84,4	20	62,5	47	100	0,048	3,240
Not having a smoking habit	5	15,6	12	37,5	17	100		

3. The Relationship Between Birth Weight and The Incidence of Pneumonia in Toddlers

The results showed that low birth weight has an association with the incidence of pneumonia in toddlers. Toddlers who have a history of low birth weight also have a risk for pneumonia. Babies with low birth weight are at risk for infection, especially pneumonia compared to babies born with normal birth weight. This can happen because babies with low birth weight experience a slowdown in their growth and development and also have weak antibodies so that they are more susceptible to disease (Januariana, 2020). [(10)]

Pneumonia is an infectious disease of the lungs caused by bacteria, viruses and fungi. This disease affects many age groups of toddlers and the elderly around the world and becomes the deadliest disease in toddlers that can be seen with almost every day there are toddlers who die. Based on the results of the study concluded that low birth weight has an association with the incidence of pneumonia and toddlers who have a history of low birth weight also have a risk for pneumonia.

This study is in accordance with research conducted by Siregar (2020) which states that there is a meaningful association between low birth weight and the incidence of pneumonia. According to researchers, low birth weight has a considerable contribution in causing a person to develop pneumonia. Therefore, mothers who have babies with a history of low birth weight are retired to pay more attention to the health of their children because children born with low birth weight have a greater risk of infection than children born with normal birth weight. [(11)]

The results of this study are in accordance with research conducted by Indrayani (2018) which showed that there is a significant association between low birth weight and the incidence of pneumonia. The results showed that toddlers who have a history of low birth weight have a risk for pneumonia disease more bear compared to toddlers who do not have a history of low birth weight. [(12)]

The results of this study do not match the study conducted by Linda who stated that birth weight does not have a significant association with the incidence of pneumonia in toddlers, other than that it states that low birth weight has a small chance of causing the incidence of pneumonia in toddlers. [(13)]

4. The Relationship Between History of Exclusive Breastfeeding and Incidence of Pneumonia in Toddlers

The results showed that breast milk (breast milk) has great benefits for the growth of children, toddlers who are given exclusively from the age of 0-6 months will have a good body defense system and also not easily attacked by disease. Breast milk is the best food for babies, because in breast milk

there are various kinds of nutrients that are very good for the child's body, so newborn toddlers are advised to be directly breastfed and given exclusively until the age reaches 6 months. (14)

The results of the chi-square test from this study showed that exclusive breastfeeding has a meaningful association with the incidence of pneumonia in toddlers at South Atambua Health Center and Halilulik Health Center in 2021. Based on the results of observations and interviews, it is known the the most toddlers have been exclusively breastfed because mothers have an awareness that breast milk is important for toddlers and there is also encouragement from health workers and families. But there are still toddlers who have pneumonia even though they have been given exclusive breast milk, this is because there are other factors that also cause children to get pneumonia such as the physical environment of the house and the smoking habits of family members.

According to Narwastu, most toddler mothers give breast milk to their children because they think that breast milk is the best food for toddlers, and is supported by family and health workers who also play an important role in making mothers exclusively breastfeed to toddlers. (15)

Children under five who do not get exclusive breast milk have a risk for pneumonia. According to Ceria (2016) this is because toddlers do not benefit from enough breast milk that is useful for the formation of antibodies as the body's defense against various diseases. (16)

5. The Relationship between Immunization Status and Pneumonia Incidence in Toddlers

Immunization is a very important effort to increase the toddlers immune system and also protect the toddlers body from disease that can be prevented by immunization, several disease than can be prevented by immunization include tuberculosis, diptheria, tetanus, hepatitis B, pertusis, measles, rubella, polio, meningitis and pneumonia. Chidren who are given routine immunizations will be protected from dangerous disease that can cause disability or death. (17)

The results showed that there was no meaningful association between immunization status and the incidence of pneumonia in toddlers in South Atambua Health Center and Halilulik Health Center in 2021. This is because most of the samples found have been fully immunized according to their age. Pneumonia is also not only caused by one risk factor but is caused by many risk factors such as smoking habits, the physical condition of the home, environmental conditions and also regular breastfeeding for 0-6 months.

The results of this study are in accordance with research conducted by Permatasari which stated that there is no meaningful relationship between the complete immunization status of toddlers and the incidence of pneumonia. This is because the incidence of pneumonia is not only caused by a single factor such as immunization but also caused by other factors, according to Permatasari factors that are closely related to the incidence of pneumonia are nutritional status, environmental conditions and smoking habits. (18)

This study is in accordance with research conducted by (Z Lailla et al, 2020) which showed that there is no meaningful association between complete basic immunization status and the incidence of pneumonia in toddlers. According to researchers, immunization status is not the only factor that causes pneumonia in toddlers. [19]

This study does not match the research conducted by Kahfi who stated that immunization status has a significant association with the incidence of pneumonia. Observations conducted by researchers showed that most of the respondents studied had incomplete immunization status because of parents work and mothers lack of knowledge. [20]

6. The Relationship between Smoking Habits and Incidence of Pneumonia In Toddlers

The family is the best refuge for children. Therefore, the family must minimize behavior that can cause diseases such as smoking behavior in the house. Smoking is a factor that is part of one of the factors that cause pneumonia, because in cigarettes there are various chemicals that are harmful to health that can interfere with lung defense function. Sugihartono and Nurjazuli stated that smoking can increase adverse consequences for people with pneumonia, kidney failure and hypertension. The habit of smoking family members can harm people who smoke and also people around who do not smoke or known as passive smoking, because of the harmful content contained in exhaled cigarette smoke. Mothers, infants and children are mostly from the group of people who become passive smokers because of family members who smoke indoors. The result of smoking habits of family members that harm passive smoking is increasing the risk of lung cancer and heart disease. In fetuses, infants and children have a high risk of low birth weight, bronchitis and pneumonia, ear cavity infections and asthma. [21]

Based on the results of the analysis it is known that there is a significant association between smoking habits of family members and the incidence of pneumonia in toddlers in South Atambua Health Center and Halilulik Health Center in 2021. The results of the calculation of odds ratio (OR) with a level of trust (CI) of 95% showed toddlers who life with family members who have a smoking habit are at risk of developing pneumonia compared to toddlers who live with family members who do not have smoking habits. The results also showed that of the respondents encountered most of his family members were active smokers. Active smokers can cause the health of other family members to be disrupted, especially toddlers.

This study is in accordance with research conducted by Alnur states that toddlers who live at home with families who smoke have a risk of developing pneumonia judging from or calculations so it can be concluded that toddlers who live with family members who smoke have a greater risk of pneumonia compared to toddlers who do not live with family members who are not smokers in their homes. [22]

CONCLUSION

Based on the results of the study can be concluded that there is a significant association between birth weight, history of exclusive breastfeeding and smoking habits with the incidence of pneumonia in toddlers, while for immunization status there is no significant association to the incidence of pneumonia in toddlers. Parents of toddlers are expected, especially mothers as important people who are closest to toddlers are expected to be able to take good care of their children such as routinely bringing their children to posyandu, exclusively breastfeeding, and avoiding family members who do smoking activities. In addition, the husband as a father is expected not to smoke in the house. For health workers such as midwives, nurses and health cadres are expected to be able to convey information and encouragement to parents to pay attention to their children's health. Health workers are expected to provide information to the parents of toddlers must be done continuously both at the time of posyandu and personal consultations that benefit the health of the child.

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