Waluya The International Science Of Health Journal
Vol.3 No.3

ISSN: 2829-2278

WALUYA THE INTERNATIONAL SCIENCE OF HEALTH JOURNAL

A Study on Environmental and Health History Risk Factors for Pneumonia Cases in Toddlers at Motui Health Center

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ARTICLE INFO

Article history
Received : September 03th, 2024
Revised : September 25th, 2024
Accepted : September 30th, 2024

Keywords
Toddler Health History,
Environment,
Pneumonia.

ABSTRACT

Introduction: Pneumonia case data in North Konawe Regency / 1000 Toddlers in 2017 found 121 cases, in 2018 found 175 cases, in 2019 increased found 162 cases for 2020 decreased by 158 cases and in 2021 found increased with a total of 240 cases from 888 toddlers handled by health workers. The purpose of this study was to study on environmental and health history risk factors for pneumonia cases in toddlers at Motui Health Center.

Method: The study used a quantitative method with an observational approach using a Case Control Study design. This study was conducted from March 1 to May 1, 2023. The sample size for each group was at least 46 samples. The comparison of case and control samples is 1: 1. The total sample is 92 respondents with a simple random sampling technique, using the SPSS 26 statistical test.

Result: The health history of toddlers has a risk of 8.67 times for the occurrence of pneumonia, environmental conditions have a risk of 8.91 times for the

Conclusion: The need for a North Konawe District Health Service specifically for handling infectious disease programs.

Introduction

Most respiratory infections, such as the common cold, are caused by viruses and do not require antibiotic treatment at this stage, but special attention should be paid to pneumonia. Upper respiratory infections, especially those caused by viruses, are common in all groups of people during the winter. ARI tends to occur in children because their immune systems are not fully developed.[1]

According to the World Health Organization in 2022, pneumonia cases were more than 800,000 children under five worldwide, or 39 children every second. Half of deaths in children under the age of five are due to pneumonia.[2]Pneumonia is also the leading cause of infant mortality in Indonesia. In 2018, an estimated 19,000 children

died from pneumonia. Global estimates put the number of children suffering from pneumonia in Indonesia at 71 per hour.[3]

Based on the 2018 ARI Sub-Directorate Routine Report data, it is known that the incidence rate (per 1,000 toddlers) is 20.06% in Indonesia, and in 2019 there were 20.56% cases. One of the efforts to prevent this case is to increase detection of pneumonia in toddlers. The estimated number of pneumonia cases nationally is 3.55% but the estimated number of pneumonia cases in each district uses different numbers according to the predetermined numbers.[4]

Infectious diseases are a contributor to death in the group of children aged 29 days - 11 months.[5]Similar to the previous year, in 2020, pneumonia and diarrhea were still the main problems causing 73.9% of deaths (pneumonia) and 14.5% of deaths (diarrhea). Other causes of death include congenital heart defects, other congenital defects, meningitis, dengue fever, neurological diseases, and others. The coverage of pneumonia in toddlers in Indonesia ranged from 20-30% from 2010 to 2014, and from 2015 to 2019 there was an increase in coverage due to a change in the estimated number of cases from 10% to 3.55%. However, in 2020 there was a decrease again to 34.8%. This decline was more due to the impact of the COVID-19 pandemic, where the stigma on COVID-19 sufferers has an impact on the decline in the number of visits by toddlers with coughs or difficulty breathing at health centers, in 2019 the number of visits by toddlers with coughs or difficulty breathing was 7,047,834 visits, in 2020 it became 4,972,553 visits, a 30% decrease from visits in 2019 which ultimately had an impact on the discovery of toddler pneumonia.[6]

It is known that the percentage of pneumonia cases in toddlers, the incidence of pneumonia in Southeast Sulawesi in 2017 was 12% of children. reported with pneumonia and in 2018 it was 35.02%, in 2019 it was 13.1% of children and grouped into pneumonia, the coverage of pneumonia cases in toddlers according to province in 2020 was 12.1% with a target of 80%, in 2021 the coverage of pneumonia cases in toddlers (%) according to province was 10% of the target of 65% of the target.[7]

Data on pneumonia cases in several regencies in Southeast Sulawesi according to the 2019 Southeast Sulawesi provincial health profile is known to be the highest in Konawe Regency and followed by several other regencies, including Konawe Regency with 81.04%, Kolaka Regency with 54.40%, South Konawe Regency with 49.72%, Muna Regency with 32.36%, Kendari City with 26.52%, South Buton Regency with 25.07%, West Muna Regency with 22.09%, Buton Regency with 19.80, Bau-Bau City with 15.43%, East Kolaka Regency with 10.26%, Central Buton Regency with 9.54, North Buton Regency with 7.12%, Bombana Regency with 4.25%, Konawe Islands Regency with 2.43%, Wakatobi Regency with 1.50, North Konawe Regency with 0.87% and North Kolaka Regency with 0.61%.[8]

Data on pneumonia cases in several regencies in Southeast Sulawesi according to the 2020 Southeast Sulawesi provincial health profile is highest in Kolaka Regency with a total of 36.61%, North Konawe Regency with a total of 27.02%, Konawe Regency with a total of 15.42%, South Konawe Regency with a total of 13.56%, Muna Regency with a total of 11.38%, Kendari City with a total of 10.97%, Kendari City with a total of 26.52%, South Buton Regency with a total of 3.99%, Bombana Regency with a total of 2.95%, South Buton Regency with a total of 1.1.67%, East Kolaka Regency with a total of 1.37%, Bau-Bau City with a total of 1.18%, North Kolaka Regency with a total of 9.54, North Buton Regency with a total of 0.44%, Central Buton Regency with a total of 0.36%, Wakatobi Regency with a total of 0.03%, Konawe Islands Regency has not reported and West Muna Regency has not reported.[8]

The infant mortality rate per 1,000 live births in North Konawe Regency in the period 2017-2021 fluctuated. The infant mortality rate in North Konawe Regency in 2021 was 2.4 per 1,000

live births, which means that in every 1,000 live births there were at least 2 infant deaths.[9]

There are some people who take advantage of the nickel industry as a business, be it building boarding houses or rented accommodation and food for employees working in mining companies. Regarding public health issues according to data in Motui District, North Konawe Regency, after the establishment of the mining company, more and more people went for treatment at health service facilities in North Konawe Regency compared to before the mining company existed. With the dominant health problem being diseases caused by environmental pollution.

Thus, the author is interested in conducting research with the title analysis of the magnitude of the risk factors for toddler health history and the environment towards pneumonia in toddlers in the Motui Health Center work area.

Method

The study used a quantitative method with an observational approach using a Case Control Study design. This study was conducted from March 1 to May 1, 2023. The sample size for each group was at least 46 samples. The comparison of case and control samples is 1: 1. The total sample is 92 respondents with a simple random sampling technique, using the SPSS 26 statistical test.

Result

Table 1 shows that there is a significant relationship between the variable Child health history and the incidence of pneumonia and the OR value obtained is 8.67 times the risk of experiencing pneumonia for respondents with poor child health history where the lower threshold value is 3.19 and the upper threshold value is 23.53.

Table 2 shows that the data shows a significant relationship between the variable of Child Environmental Condition History and the incidence of Pneumonia and obtained an OR value of 8.91 times the risk of experiencing pneumonia for respondents with poor environmental conditions where the lower threshold value is 3.32 and the upper threshold value is 23.60.

Table 1.
Child Health History on the Risk of Pneumonia in Toddlers

Child Health History	Pneumonia				Total	%	OR	95% Confidence Interval (CI)	
	Case		Control						
	f	%	f	%				Lower	Upper
Not enough	39	84.78	18	39.13	57	61.96	8.67	3.19	23.53
Good	7	15.22	28	60.87	35	38.04			
Total	46	100.0	46	100.0	92	100.0			

Table 2.
Environmental Conditions on the Risk of Pneumonia in Toddlers

Environmental Conditions	Pneumonia				Total	%	OR	95% Confidence Interval (CI)	
	Case		Control						
	f	%	f	%				Lower	Upper
Not enough	30	65.22	8	17.39	38	41.30	8.91	3.32	23.60
Good	16	34.78	38	82.61	54	58.70			
Total	46	100.0	46	100.0	92	100.0			

Discussion

Child Health History on the Risk of Pneumonia in Toddlers

The results of the univariate analysis where among the 57 respondents with a history of poor child health, 18 (39.13%) did not have pneumonia, this is due to other factors such as good access or health service system and far from mining settlements, it is also known that out of 35 respondents with a history of good health, 7 (15.22%) experienced pneumonia, this can be explained that the 7 (seven) respondents have a residence quite close to the mining area and access to health services that are quite far away, with access to health services that are quite far away can affect the impact of low health education received by respondents such as the importance of exclusive breastfeeding, immunization, clean and healthy living behavior and environmental health.

It is known from the results of the bivariate analysis that there is a significant relationship between the variable Child health history with the incidence of Pneumonia and there is an 8.67 times risk of pneumonia for respondents with poor child health history with a lower threshold of 3.19 times and an upper threshold of 21.53 times experiencing risk where it can be explained that the small possibility occurs as much as 3, 19 times and the high possibility of risk occurs as much as 21.53 times. Furthermore, the results of the multivariate analysis show that the variable Health history is a variable that has a large influence on the incidence of pneumonia with the results of the Wald analysis being smaller than alpha, namely 0.003 <0.05.

From the results of the analysis in accordance with the facts of the field of observation results where there are still toddlers with incomplete immunization and have a history of pneumonia both respondents and their families. Difficult access to health services and the presence of mining in the Motui area increase the potential for pneumonia.

The Toddler Health History referred to in this study looks at the Toddler Health Status History based on the completeness of immunization, not born prematurely, normal growth and development and no previous illness with infection, this was found in several facts in the field based on the health profile data of the Motui Health Center, it was known that there were toddlers with incomplete immunization and visits of toddlers sick with infection, this has the potential to experience pneumonia due to weak antibodies and also poor health history.[10]Breast milk-based health history is a fluid consisting of a mixture of two substances, fat and water found in protein, lactose and inorganic salts produced by the mother's mammary glands, and is useful as baby food which is believed to prevent disease.[11]

Previous researchers stated the same thing, where children who do not receive exclusive breastfeeding are 4.55 times more likely to get pneumonia compared to children who receive exclusive breastfeeding (OR: 4.55 and P = 0.009).[12] In line with other study showed similar results where children who did not receive exclusive breastfeeding had a 7.22 times greater chance of developing pneumonia compared to children who received exclusive breastfeeding (P = 0.006 and OR: 7.22).[13]

For babies with low birth weight can face problems that begin with the formation of incomplete immunosuppressants and the risk of infection, especially pneumonia, so the risk of death is greater than normal birth weight. Small children with a history of LBW are at high risk of pneumonia due to developmental disorders and immaturity of the respiratory organs.[14]

This is reinforced by the results of research with the same variables because BBLR has a risk factor of 4,136 times in pneumonia sufferers. Babies with low birth weight in the first month of

birth will be at risk of pneumonia and other respiratory tract infections because the formation of active immune substances is still not ideal.[10]

In addition, nutritional status and infection are interrelated, because infection can cause malnutrition and vice versa, nutritional status can also cause infection. Energy sources in the body will be depleted because normal immunological reactions will be inhibited due to infection.[15]This is also reinforced by the results of previous studies where toddlers with poor nutritional status are 6.52 times more likely to suffer from pneumonia compared to toddlers with good nutritional status. The latest research also states such results, namely toddlers with poor/less nutritional status have a 3.85 times greater risk of suffering from pneumonia compared to toddlers with good nutritional status (OR: 3.85).[5]

Other health history that greatly influences the prevention of pneumonia is Immunization status affects a person's endurance or immunity. The more complete the food immunization, the greater the body's endurance. However, on the contrary, incomplete immunization tends to only make babies closer to certain diseases.[16]

The results of the study stated that toddlers with incomplete immunization status have a 7.8 times greater risk of suffering from pneumonia compared to toddlers with complete immunization status (P = 0.006 and OR: 7.8). The latest research also stated the same thing where toddlers with incomplete immunization status have a 2 times greater risk of suffering from pneumonia compared to toddlers with complete immunization status (p-value = 0.034 and OR: 1.93).[17]

Thus, researchers assume that it is important to prioritize children's health needs,[18]especially for toddlers who are very susceptible to contracting diseases such as pneumonia and other diseases, because apart from looking at the humanitarian side, it is also part of maintaining state assets for the future by creating a better and more qualified young generation.

Recommendations for researchers related to this variable are the need to improve the integrated health service system with the local government by activating more mobile health center programs and tracking sick toddlers and children in each village and sub-district.

Environmental conditions on the risk of pneumonia in toddlers

It is known that the results of the univariate analysis among 34 respondents with poor environmental conditions, 8 (17.39%) did not have pneumonia. This is due to other factors such as complete vaccinations and a history of exclusive breastfeeding. It is also known that among 54 respondents with good environmental conditions, 16 (34.78%) experienced pneumonia.

This can be explained that the respondents have less knowledge about the causes of pneumonia, where pneumonia is not only caused by poor environmental conditions but clean and healthy living behavior such as smoking in the house, not getting used to washing hands and other factors such as immunization and exclusive breastfeeding, the results of observations also found that the respondents lived quite far from access to health services.

The results of the bivariate analysis obtained an OR value of 8.91 times at risk of experiencing pneumonia where the lower threshold value was 3.32 and the upper threshold value was 23.60, where it was known that there was a significant relationship between the variable of the Child's Environmental History and the incidence of Pneumonia, where it can be explained that the small possibility of occurring was 3.32 times and the high possibility of risk was 23.60 times. In the multivariate analysis, the Environmental Condition variable did not significantly affect the pneumonia incidence variable where the Wald value was greater than alpha, namely 1,570> 0.05.

Poor environmental conditions have the potential to increase the number of cases of pneumonia, where dusty environments due to mining operations and inadequate housing conditions, such as floors with poor ventilation and

poor environmental cleanliness, have the potential to increase the incidence of pneumonia.

Environmental conditions can be seen from several indicators, namely by paying attention to several things that can be used as assessment indicators, namely: Occupancy Density, Room Ventilation and Type of House Floor. The standard area of ventilation or air circulation media according to the regulation of the Indonesian Ministry of Health No. 829 of 1999 is at least 10% of the floor area. Rooms with ventilation of less than 10% are at risk of pneumonia which is exacerbated if there are humans exposed in one room, the number of bacteria in the air will increase.[19]

From the results of research conducted bySulistiarini and Berliana, it was concluded that there is a statistically significant relationship between occupancy intensity and the incidence of pneumonia in toddlers.[20] The results of this study are in line with research conducted by Suryani et al., which shows that toddlers living in dense settlements have a 4.4 times greater risk of developing pneumonia (P-value = 0.005 and OR: 4.4.).[21]

Previous studies have shown a significant relationship between inadequate room area ventilation (less than 10% of floor area) and the incidence of pneumonia in young children. Previous studies with the same variables showed a significant relationship between inadequate ventilation area (<10% of floor area) and the incidence of pneumonia in toddlers, obtained p-value = 0.003.[22]

Decree of the Minister of Health of the Republic of Indonesia No. 829 of 1999 concerning Requirements for Residential Houses with Good Floor Requirements, Weatherproof and Easy to Clean, such as: Floors made of ceramic tiles. Waterproof tiles or hard cement. House floors that are not waterproof and difficult to clean will become a place for microorganisms to grow in the house (Decree of the Minister of Health No. 829 of 1999 Concerning: Housing Health Requirements, 1999).[19]

Based on the research results reviewed together with several references and previous research results, the residence and environment where toddlers live must be given more attention because with an uncontrolled physical environment in terms of health, it will be easier for various microorganisms to grow easily and quickly so that toddlers will be susceptible to illness.

There is a need to increase socialization related to clean and healthy living behavior, as well as increasing the achievement of immunization programs for toddlers in the Motui Health Center work area to minimize the occurrence of pneumonia cases considering that Motui District is an area with a mining area so that it is susceptible to pneumonia, so there is a need for adjustments to prevention by increasing the achievement of health programs such as forming villages by implementing clean and healthy living behavior.

Conclusion

Specifically for the handling of infectious disease programs in North Konawe Regency, it should be more intensive in preventing diseases, by increasing epidemiological surveys or surveillance to obtain problems in the North Konawe Regency area and as material for consideration in policy making by the government.

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