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ANALYSIS OF RISK FACTORS FOR THE INCIDENT OF PNEUMONIA IN TODDLER CHILDREN AGED 12-59 MONTHS IN THE AREA OF THE KALIBARU HELPING PUSKESMAS NORTH JAKARTA

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Abstract

Background: Pneumonia in toddlers is one of the main causes of death in Indonesia. Around 150,000 children under five are estimated to die every year from pneumonia. The majority of deaths occur in infants. Worldwide, it is estimated that more than 2 million toddlers die from pneumonia every year, which means one toddler dies every 20 seconds. Objective: to study the analysis of risk factors for the incidence of pneumonia in children under five aged 12-59 months in the Kalibaru Sub- Puskesmas Area, North Jakarta. Method: cross-sectional population is all children who experienced pneumonia at the Kalibaru Sub-Public Health Center, North Jakarta. The population in this study was 112 people. The sample in this study was 90 people, with a sampling technique using simple random sampling, analysis using univariate and bivariate. Results: From the results of statistical tests on the incidence of pneumonia, the majority of respondents, 53 (58.9%) of respondents experienced pneumonia and almost 37 (41.1%) of respondents did not experience pneumonia. There is a relationship (age of toddler p-value 0.028 OR value =3.560, gender p-value 0.015 OR value =3.277, immunization status p-value 0.028 OR value =3.560, nutritional status p-value 0.016<α =0.05 OR value = 3,491 with the incidence of pneumonia. There is no relationship (education, maternal occupation, access to health services, and area of residence) with the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. Conclusion: It is hoped that health workers can provide additional information regarding the factors that cause pneumonia so that they can provide preventative solutions when providing education, especially at POLI MTBS and MTBM.

Keywords: Analysis of Pneumonia Risk Factors, Toddlers

Introduction

Pneumonia is an acute infection that affects lung tissue, causing symptoms such as coughing, runny nose and difficulty breathing, especially in children. Symptoms can vary, where in older children, generally there is coughing and rapid breathing accompanied by chest wall retraction. However, in babies, pneumonia symptoms are often not pronounced with coughing and can occur without symptoms the (Hts, 2023).

Previously, the term used for this case was Acute Respiratory Infection (ARI). ARI covers a wider range, including infections of the upper respiratory tract such as the nose, ears and throat. However, in the context of pneumonia, the focus is on acute infections of the lower respiratory tract. Today, the term pneumonia refers to conditions that were previously categorized as severe ARI or moderate ARI, placing emphasis on serious infections of the lower respiratory tract (Nainggolan, 2019).

Pneumonia is one of the main causes of death in toddlers throughout the world. It is estimated that there are around 150 million cases of under-five deaths each year due to pneumonia globally, with

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a death toll of 808,000 in 2017 according to data from *the World Health Organization* (WHO) (Hakim, 2023). According to *the United Nations International Children's Emergency Fund* (UNICEF) in 2017, the incidence of pneumonia reached more than 1,400 cases per 100,000 children, meaning that around 1 in every 71 children experiences pneumonia every year. The areas with the highest incidence occurred in developing countries, particularly in South Asia with 2,500 cases and in the West and Central Africa region with 1,620 cases. This shows the large burden of this disease, especially in areas with limited health and sanitation conditions (Anonim, 2022).

Indonesia is included in the 30 countries with the highest pneumonia burden in the world according to UNICEF and is ranked seventh in the number of pneumonia cases based on WHO data in 2017. According to the 2018 Indonesian Health Profile, there were around 505,331 cases of pneumonia in children under five, accounting for around 56.51% of the total. cases, with a death toll of around 425 or around 0.08. In 2019, the number of pneumonia cases decreased to 468,172 cases or around 52.9%, but the number of deaths increased to 551, around 0.12% of the total cases. This increase in the number of deaths represents an increase of 0.4% from previous pneumonia cases, highlighting the need for attention to the management of pneumonia in children under five in Indonesia (Monoarfa, 2022).

In the period 2009-2018, the number of pneumonia cases in children under five in Indonesia continued to increase, but there was a decline in 2019-2020. This decline was influenced by the Covid-19 pandemic which caused stigma towards Covid-19 sufferers, resulting in a decrease in visits by toddlers who were coughing or having difficulty breathing at community health centers. In 2019, the number of visits reached 7,047,834, but in 2020, these visits dropped drastically to 4,972,553, a decrease of 30% from the previous year. This decrease in visits ultimately influenced the discovery of pneumonia cases in toddlers in Indonesia (Lambang, 2020).

Pneumonia in toddlers is one indicator of the success of environmental health and control programs, in accordance with the Strategic Plan of the Ministry of Health 2010-2014, with a target of reaching 100% of pneumonia cases in 2014. Pneumonia in toddlers can be caused by various microorganisms, including viruses, fungi, and bacteria. The main cause of pneumonia in toddlers is often bacteria such as *Streptococcus Pneumoniae* and *Hemophilus Influenzae Type* B. In more severe cases of pneumonia, there are also *Staphylococcus Aureus* and *Klebsiella Pneumoniae*. Pneumonia transmission can occur through the air when the sufferer coughs or sneezes, but can also be through other fluids such as blood during birth or through contamination of objects used by the sufferer (Suci, 2020).

Symptoms of pneumonia in toddlers vary depending on age and the cause of the infection. Bacterial infections tend to cause severe symptoms such as high fever and rapid breathing. Common symptoms that often appear in toddlers with pneumonia include coughing, fever, chills, headaches and loss of appetite. Toddlers with severe pneumonia may have difficulty breathing, visible rapid chest movement or chest retraction when breathing, which is called *lower chest wall sensing*. In early childhood, symptoms can include seizures, decreased consciousness, decreased body temperature (hypothermia), lethargy, and drinking disorders (Garina, 2016).

Pneumonia in toddlers is one of the main causes of death in Indonesia. Around 150,000 toddlers are estimated to die every year from pneumonia, which if calculated on average, every 4 minutes a toddler dies from this condition, or around 17 toddlers per hour, or 416 toddlers per day. The majority of deaths occur in infants. Worldwide, it is estimated that more than 2 million toddlers die from pneumonia every year, which means one toddler dies every 20 seconds (Siregar, 2020).

Previous research by Dwalasono (2022) revealed that several factors such as low birth weight (LBW), immunization status, exclusive breastfeeding, nutritional conditions, gender, education level and mother's occupation are risk factors that contribute to the incidence of pneumonia in toddlers (Dwalasono, 2022). However, according to research by Mardani, Pradigdo, and Mawarni (2018), there are two factors associated with the incidence of pneumonia in toddlers, namely intrinsic factors and

extrinsic factors. Intrinsic factors involve existing conditions in toddlers, including age, gender, low birth weight, immunization status, exclusive breastfeeding, vitamin A consumption, and nutritional status. Meanwhile, extrinsic factors involve aspects of the environment around toddlers, such as residential density, type of house, ventilation, lighting, humidity, type of fuel used, family income level, and mother-related factors such as education level, knowledge, and smoking habits of family members (Mardani, 2018).

Based on research by Merlinda Permata Sari (2019), it was revealed that the incidence of pneumonia is more likely to occur in boys than girls. This is caused by physical differences in the anatomy of the respiratory tract between the two sexes, where the respiratory tract of boys tends to have a smaller diameter than that of girls. This difference can influence the frequency of respiratory tract diseases in toddlers, because smaller respiratory tracts are more susceptible to diseases such as pneumonia. These findings highlight differences in the structure of boys' respiratory tracts that may influence the predisposition to respiratory tract disease in toddlers (Sari, 2019).

Several studies show that toddlers with insufficient or poor nutritional status have a higher risk of developing pneumonia. This condition occurs because bacteria and viruses more easily enter the body when the body's resistance or resistance decreases. Malnutrition in toddlers can weaken the immune system and respiratory muscles, making them more susceptible to pneumonia compared to toddlers with normal nutritional status. Family socio-economic factors also influence the nutritional status of toddlers, where children's nutritional intake often depends on parents' income. Parental involvement in providing nutritional intake to children is important in preventing malnutrition in toddlers (Putri, 2023).

Pneumonia, if not treated or intervened appropriately, can hamper the growth and development of toddlers and has the potential to become a threat of death. Efforts to prevent pneumonia in children under five include avoiding risk factors that trigger this disease and implementing guidelines for handling pneumonia appropriately and quickly, as well as increasing special immunization efforts such as DPT, measles, HIB and *pneumococcus.* To reduce the death rate due to pneumonia, the government can involve various efforts such as increasing access and quality of health services for children under five, as well as promoting community participation in early detection and gradual expansion of (Lambang, 2020)*Pneumococcus Conjugated Vaccine (PCV) immunization*.

Based on a preliminary study conducted on December 11, 2023, the prevalence of pneumonia in children has increased every year, namely in 2018 as much as 17.4%, in 2019 as much as 17.7%, in 2020 as much as 17.9%, in 2021 as much as 21%, in 2022 as many as 25.5% of pneumonia patients will receive incentive treatment, especially for pediatric patients who are detected early during a visit to the MTBM Polyclinic, the midwife will carry out an examination and then collaborate with the doctor in providing therapy and referrals.

This research was carried out because it is important to deepen understanding of the risk factors for pneumonia in toddlers in the work area of community health centers. Without research, potential problems related to pneumonia in toddlers may not be revealed comprehensively. Therefore, research with the title " Analysis of risk factors for the incidence of pneumonia in children under five aged 12-59 months in the Kalibaru sub-district health center area, North Jakarta in 2022 " is interesting and significant to carry out in order to explore the factors that influence the incidence of pneumonia in toddlers in the region. the. The formulation of the problem in this research is what is the description of the incidence of pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta? The aim of this study was to determine the risk factors for pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta.

Research Methods

cross sectional research design. The population in this study was 112 children who experienced pneumonia at the Kalibaru Sub-Public Health Center, North Jakarta. The sample in this study was 90 people, with a sampling technique using simple *random sampling*. Data collection with secondary data. Data analysis uses univariate and bivariate analysis, then to find the risk using *the Odds Ratio*.

Research Result

1. Univariate Analysis

Table 1. Description of the incidence of pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta (n=90)

Pneumonia	Frequency	Percentage
Not pneumonia	37	41.1
Pneumonia	53	58.9
Total	90	100.0

Based on table 1, the data obtained that the incidence of pneumonia in Pustu Kalibaru Cilincing, the majority of respondents, 53 (58.9%) of respondents experienced pneumonia and almost 37 (41.1%) respondents did not experience pneumonia.

Table 2. Description of the characteristics of the incidence of pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta (n=90)

Variable	Frequency	Percentage
Toddler Age		
12-59 Months	20	22.2
2-11 Months	70	77.8
<2 Months	0	0.0
Gender		
Woman	34	37.8
Man	56	62.2
Immunization **Status**		
Complete Immunization	20	22.2
Immunization Incomplete	70	77.8
Nutritional status		
Good Nutrition	56	62.2
Malnutrition	34	37.8
Mother's Education		
Higher education	2	2.2
Middle education	34	37.8
basic education	54	60.0
Mother's Job		
PNS/TNI/POLRI/BUMN/Private	18	20.0
Entrepreneur / trader / service provider	4	4.4
not working / housewife	68	75.6
Access to Health Services		
<1km	84	93.3
1-5km	6	6.7
>5 Km	0	0.0
Area of Residence		
Urban	89	98.9
Rural	1	1.1

Total	90	100.0

Based on table 2, the data obtained that the characteristics of respondents in the Kalibaru North Jakarta Sub-Public Health Center area are that of the 90 respondents, almost 20 respondents (22.2%) were aged 12-59 months and the majority of respondents 70 (77.8%) were aged 2-11 months. Of the 90 respondents, it is known that almost all of the respondents, 34 (37.8%) were women and 56 (62.2%) were men. Of the 90 respondents, it was found that almost 34 respondents (37.8%) had received complete immunization and most of the 70 respondents (77.8%) had not received complete immunization. Of the 90 respondents, it was found that the majority of respondents, 56 (62.8%) had good nutritional status and almost all of the respondents, 34 (37.8%) were malnourished. Of the 90 respondents, it is known that the mother's occupation of a small number of respondents, 18 (20%) work as civil servants/TNI/POLRI/BUMN/private sector and 4 (4.4%) work as entrepreneurs/traders/services, the majority of respondents 68 (75, 6%) do not work / housewives. Of the 90 respondents, it was found that access to health services for the majority of respondents 84 (93.3) was <1km and a small number of respondents 6 (6.7%) 1-5 km. Of the 90 respondents, it is known that generally 89 respondents (98.9) are in urban areas and 1 respondent (1.1%) is in rural areas.

2. Bivariate Analysis

Bivariate analysis was carried out to determine the relationship between characteristics of toddlers (age, gender, immunization status, nutritional status), mother (education and employment) and environment (access to health services, and area of residence) with the incidence of pneumonia in toddlers aged 12-59 months in The Kalibaru North Jakarta Sub-Puskesmas area can be seen in table 3 as follows:

Table 3. The Relationship between Toddler Age and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Community Health Center, North Jakarta

Variable	**Pneumonia**				**Total**		**OR**	**p-value**
Toddler Age	**Not pneumonia**		**Pneumonia**				***Confident Interval***	
	F	**%**	**F**	**%**	**F**	**%**		
12-59 months	13	65.0	7	35.0	20	100.0		
2-11 months	24	34.3	46	65.7	70	100.0	3,560 (1,254-10,101)	0.028
Amount	37	41.4	53	58.9	90	100.0		

Based on table 3, of the 20 respondents aged 12-59 months, 13 respondents (65%) had no pneumonia and 7 respondents (35%) had pneumonia, of the 70 respondents aged 2-11 months there were 24 respondents (34.3%) who did not have pneumonia. and 46 respondents (70%) experienced pneumonia. Results of statistical tests carried out using *chi square* with *Continuity Correction analysis* [b] obtained *a p-value of 0.028* $<\alpha = 0.05$, so it can be concluded that there is a relationship between child age and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, the OR value was obtained = 3.560 ((95% CI 1.254-10.101), meaning that respondents aged 2-11 months had a higher chance of experiencing pneumonia.

Table 4. The Relationship between Gender and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center North Jakarta

Variable	Pneumonia				Total		OR	p-value
Gender	Not pneumonia		Pneumonia				*Confident Interval*	
	F	%	F	%	F	%		
Woman	20	58.8	14	41.2	34	100.0	3,277 (1,347 - 7,975)	0.015
Man	17	30.4	39	69.6	56	100.0		
Amount	37	41.4	53	58.9	90	100.0		

Based on table 4, of the 34 respondents based on gender of toddler girls, 20 respondents (58.8%) had no pneumonia and 14 respondents (41.2%) had pneumonia. Of the 56 male respondents, 17 respondents (30.4%) had no pneumonia and 39 respondents (69.6%) had pneumonia. Results of statistical tests carried out using *chi square* with *Continuity Correction analysis* [b] obtained *a p-value of 0.015* $<\alpha$ = 0.05, so it can be concluded that there is a relationship between gender and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, it was obtained that the OR value was = 3.277 ((95% CI 1.347-7.975), meaning that respondents who were male had a higher chance of experiencing pneumonia.

Table 5. Relationship between Immunization Status and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center North Jakarta

Variable	Pneumonia				Total		OR	p-value
Immunization Status	Not pneumonia		Pneumonia				*Confident Interval*	
	F	%	F	%	F	%		
Complete Immunization	13	65.0	7	35.0	20	100.0	3,560 (1,254-10,101)	0.028
Immunization Incomplete	24	34.3	46	65.7	70	100.0		
Amount	37	41.4	53	58.9	90	100.0		

Based on Table 5, of the 20 respondents with complete immunization status, 13 respondents (65%) did not have pneumonia and 7 respondents (35%) had pneumonia. Of the 70 respondents with incomplete immunization status, 24 respondents (34.3%) did not have pneumonia and 46 respondents (70%) had pneumonia. Results of statistical tests carried out using *chi square* with *Continuity Correction analysis* [b] obtained *a p-value of 0.028* $<\alpha$ = 0.05, so it can be concluded that there is a relationship between immunization status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, it was obtained that the OR value was = 3.560 ((95% CI 1.254-10.101), meaning that respondents whose immunizations had not been completed had a higher chance of experiencing pneumonia.

Table 6. The Relationship between Nutritional Status and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center North Jakarta

Variable	Pneumonia				Total		OR	p-value
Nutritional status	Not pneumonia		Pneumonia				*Confident Interval*	
	F	%	F	%	F	%		
Good Nutrition	29	51.8	27	48.2	56	100.0	3,491 (1,350-9,027)	0.016
Malnutrition	8	23.5	26	76.5	34	100.0		
Amount	37	41.4	53	58.9	90	100.0		

Based on Table 6, of the 56 respondents with good nutritional status, 29 respondents (51.8%) had no pneumonia and 27 respondents (48.2%) had pneumonia. Of the 34 respondents with poor nutritional status, 8 respondents (23.5%) had no pneumonia and 26 respondents (76.5%) experienced pneumonia. Results of statistical tests carried out using *chi square* with *Continuity Correction analysis* [b] obtained *a p-value of 0.016<α* =0.05, so it can be concluded that there is a relationship between nutritional status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta 3. From the results of the analysis, it was obtained that the OR value was = 3.491 ((95% CI 1.350-9.027), meaning that respondents who were malnourished had a higher chance of experiencing pneumonia.

Table 7. The Relationship between Maternal Education and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center North Jakarta

Variable	Pneumonia				Total		p-value
Education	Not pneumonia		Pneumonia				
	F	%	F	%	F	%	
Higher education	1	50.0	1	50.0	2	100.0	0.966
Middle education	14	41.2	20	58.8	34	100.0	
Basic education	22	40.7	32	59.3	54	100.0	
Amount	37	41.4	53	58.9	90	100.0	

Based on Table 7, of the 2 respondents with higher education, 1 respondent (50%) had no pneumonia and 1 respondent (50.0%) had pneumonia. Of the 34 respondents with secondary education, 14 respondents (41.2) had no pneumonia and 20 respondents (58.8%) experienced pneumonia. Of the 54 primary education respondents, 22 respondents (40.7%) did not have pneumonia and 35 respondents (59.3%) had pneumonia. The results of statistical tests were carried out using *chi square* with *Pearson chi square analysis* obtained *a p-value of 0.966>α* =0.05, so it can be concluded that there is no relationship between education and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta.

Table 8. The Relationship between Maternal Occupation and the Incidence of Pneumonia in Toddlers at Community Health Centers Servant Kalibaru Cilincing

Variable	Pneumonia				Total		p-value
Work	Not pneumonia		Pneumonia				
	F	%	F	%	F	%	
PNS/TNI/POLRI/BUMN/Private	9	50.0	9	50.0	18	100.0	0.622
Entrepreneur / trader / service provider	2	50.0	2	50.0	4	100.0	
Not working / housewife	26	38.2	42	53.3	68	100.0	
Amount	37	41.4	53	58.9	90	100.0	

Based on Table 8 of 18 respondents Mother Work as civil servants/TNI/POLRI/BUMN/private sector, there were 9 respondents (50%) who did not have pneumonia and 9 respondents (50.0%) had pneumonia. Of the 4 respondents who were working mothers, entrepreneurs/traders/services, there were 2 respondents (50%) who were not. pneumonia and 2 respondents (50%) experienced pneumonia. Of the 68 respondents who were not working mothers/housewives, 26 respondents (38.2%) had no pneumonia and 42 respondents (53.3%) had pneumonia. The results of statistical tests were carried out using *chi square* with *Pearson chi square analysis* The p-value obtained was $0.622 > \alpha = 0.05$, so it can be concluded that there is no relationship between maternal employment and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta.

Table 9. The Relationship between Access to Health Services and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Puskesmas, North Jakarta

Variable	Pneumonia				Total		p-value
Access to Health Services	Not pneumonia		Pneumonia				
	F	%	F	%	F	%	
<1 Km	34	40.5	50	59.5	84	100.0	0.977
1-5 Km	3	50.0	3	50.0	6	100.0	
Amount	37	41.4	53	58.9	90	100.0	

Based on Table 9, of the 84 respondents with access to health services <1 km, 34 respondents (40.5%) had no pneumonia and 50 respondents (59.5%) had pneumonia, of the 6 respondents accessing health services 1-5 km there were 3 respondents (50%) not pneumonia and 3 respondents (50%) experienced pneumonia. Results of statistical tests carried out with use *chi square* with *continuity correction analysis* obtained *a p-value of* $0.977 > \alpha = 0.05$, so it can be concluded that there is no relationship between access to health services and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta.

Table 10. Relationship between area of residence and the incidence of pneumonia in toddlers at the Kalibaru Cilincing sub-district health center, North Jakarta

Variable	Pneumonia				Total		p-value
Area of Residence	Not pneumonia		Pneumonia				
	F	%	F	%	F	%	
Urban	37	41.6	52	58.4	89	100.0	1,000
Rural	0	0.0	1	100.0	1	100.0	
Amount	37	41.4	53	58.9	90	100.0	

Based on Table 10 of 89 respondents in the area stay urban there were 37 respondents (41.6%) who did not have pneumonia and 52 respondents (58.4%) had pneumonia. From 1 respondent who ebrade in the area of the place stay rural There was 1 respondent (100%) experiencing pneumonia. Results of statistical tests carried out with use *chi square* with analysis *continuity correction* obtained *p-value 1,000>α* =0.05 then can concluded that No there is place -territorial relations stay with incidence of pneumonia in community health centers servant Kalibaru Cilincing, North Jakarta.

Discussion

1. Description of the incidence of pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta

Based on the research results, it is known that the incidence of pneumonia in Pustu Kalibaru Cilincing, the majority of respondents, 53 (58.9%) of respondents experienced pneumonia and almost 37 (41.1%) respondents did not experience pneumonia. The results of this study show that the majority of respondents experienced pneumonia in children, based on several theories stating that the younger a person is, the more risky a pneumonia attack is.

Pneumonia is an acute respiratory infection that affects the lungs. Alveoli, small sacs in the lungs, normally fill with air when breathing. However, when you have pneumonia, the alveoli can fill with pus and fluid, making it difficult to breathe and disrupting oxygen intake. Pneumonia can range from mild to potentially life-threatening, affecting people of all ages. In toddlers, pneumonia is common happen simultaneously with infection acute in the tract Respiratory part upper (*bronchopneumonia*) (Purwati, 2023).

In line with Suci's research (2020) that pneumonia in toddlers is an indicator of the success of environmental health and control programs, in accordance with the Strategic Plan of the Ministry of Health 2010-2014, with a target of finding 100% of pneumonia cases in 2014. Pneumonia in toddlers can be caused by various microorganisms, including viruses, fungi, and bacteria. The main cause of pneumonia in toddlers is often bacteria such as *Streptococcus Pneumoniae* and *Hemophilus Influenzae Type* B. In more severe cases of pneumonia, there are also *Staphylococcus Aureus* and *Klebsiella Pneumoniae.* Pneumonia transmission can occur through the air when the sufferer coughs or sneezes, but can also through other fluids such as blood during birth or through contamination of objects used by the child.

2. Description of the characteristics of pneumonia in toddlers aged 12-59 months in the Kalibaru Sub-Puskesmas Area, North Jakarta

Based on the research results, it is known that the characteristics of respondents in the Kalibaru Subdistrict Health Center Area, North Jakarta, namely, of the 90 respondents, the majority of respondents 70 (77.8%) were aged 2-11 months, the majority of respondents 56 (62.2%) were male. male, most of the respondents 70 (77.8%) had not received complete immunization, most of the

respondents 56 (62.8%) had good nutritional status, most of the respondents 68 (75.6%) did not work / were housewives. the majority of respondents 84 (93.3) <1km and a small number of respondents 6 (6.7%) 1-5 km and in general 89 respondents (98.9) in urban areas and 1 respondent (1.1%) in rural areas.

The results of this study show that the research results are in agreement with theory, because from the research results it is known that the majority of those who experience pneumonia are babies aged 2-11 months, male, who have not received complete immunization and nutritional status. Although the factors education, employment, access to housing and area of residence do not really have an impact on the occurrence of childhood pneumonia. The researcher assumes that this happens because most of the North Jakarta area is an area close to factories and pollutants.

Toddlers, which include children under 5 years of age, are susceptible to various diseases because their immune systems are not yet fully formed. They tend to be susceptible to infections, including diseases caused by malnutrition or attacks by viruses and bacteria, such as influenza and pneumonia. Their narrow respiratory tract and immature immune system make them vulnerable to infection. Pneumonia has the highest incidence rate in toddlers aged 12-23 months (Dayaningsih, 2019).

In line with research by Nusa Indah, (2022)analysis of risk factors for the incidence of pneumonia in toddlers in the working area of the Sidorejo Health Center, Pagar Alam City. Of the 12 variables studied, there are 6 variables that are at risk for the incidence of pneumonia in toddlers, namely ventilation, lighting, humidity, nutritional status, smoking habits., history of breastfeeding. variables that are most at risk for the incidence of pneumonia in toddlers is lighting.

3. The Relationship between Toddler Age and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Community Health Center, North Jakarta

Based on the research results, it is known that of the 20 respondents aged 12-59 months, 13 respondents (65%) had no pneumonia and 7 respondents (35%) had pneumonia, of the 70 respondents aged 2-11 months there were 24 respondents (34.3%) not pneumonia and 46 respondents (70%) experienced pneumonia. The statistical test results obtained *a p-value of 0.028* $<\alpha = 0.05$, so it can be concluded that there is a relationship between toddler age and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, the OR value was obtained = 3.560 ((95% CI 1.254-10.101), meaning that respondents aged 2-11 months had a higher chance of experiencing pneumonia, which is the most dominant factor causing pneumonia.

In line with Supriandi's theory (2018) that pneumonia is the leading cause of death throughout the world, surpassing death rates from AIDS, malaria and measles. Every year, 1 in 5 children under five who die worldwide are caused by pneumonia. The problem is the lack of attention to pneumonia, especially in developing countries. In Indonesia, pneumonia cases have reached very high numbers, up to 6 million cases, making pneumonia a significant public health problem, especially in toddlers (Supriandi, 2018).

Meanwhile, factors that increase the death rate due to pneumonia in children under five according to Waani (2018) include age under 2 months, low socio-economic level, nutritional problems, low birth weight, low maternal education level, limited access to health services., high residential density, lack of immunization, and the presence of chronic diseases. The combination of these factors can lead to a higher risk of death from pneumonia in toddlers (Waani, 2018). Therefore, in general, risk factors for pneumonia can be divided into 4 factors, namely child factors, maternal factors, socio- economic factors, and environmental factors. environment.

4. The Relationship between Gender and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Community Health Center, North Jakarta

Based on the research results, it is known that of the 34 respondents based on the gender of toddler girls, 20 respondents (58.8%) did not have pneumonia and 14 respondents (41.2%) had pneumonia. Of the 56 male respondents, 17 respondents (30.4%) had no pneumonia and 39 respondents (69.6%) had pneumonia. The results of the statistical tests carried out obtained *a p-value of 0.015* $<\alpha$ = 0.05, so it can be concluded that there is a relationship between gender and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta 3. From the results of the analysis, it was obtained that the OR value was = 3.277 ((95% CI 1.347-7.975), meaning that respondents who were male had a higher chance of experiencing pneumonia.

Male toddlers have a higher risk of developing pneumonia compared to girls. This can be caused by physical and anatomical differences in the respiratory tract, as well as differences in body endurance between men and women. In general, the respiratory tract of male toddlers is smaller than that of girls. This condition increases the work of the respiratory muscles, affecting vital and respiratory capacity, as well as the surface area of the respiratory membrane. As a result, capacity diffusion lungs decreasing and increasing risk inflammation of the lungs (Sangadji, 2022).

5. The Relationship between Immunization Status and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Community Health Center, North Jakarta

Based on the research results, it is known that of the 20 respondents with complete immunization status, 13 respondents (65%) did not have pneumonia and 7 respondents (35%) had pneumonia. Of the 70 respondents with incomplete immunization status, 24 respondents (34.3%) did not have pneumonia and 46 respondents had incomplete immunization status. (70%) experienced pneumonia. The results of the statistical tests carried out obtained *a p-value of 0.028* $<\alpha$ = 0.05, so it can be concluded that there is a relationship between immunization status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta 3. From the results of the analysis, it was obtained that the OR value was = 3.560 ((95% CI 1.254-10.101), meaning that respondents whose immunizations had not been completed had a higher chance of experiencing pneumonia, and was the dominant factor along with age which was the main cause of pneumonia in children.

Immunization for toddlers is an important step to prevent various diseases, including pneumonia. Some immunizations associated with pneumonia include immunization against pertussis, measles, haemophilus influenza, and pneumococcus. Providing measles immunization to toddlers helps protect them from measles which can be a trigger factor for pneumonia. DPT immunization helps prevent infections that can cause pneumonia as a complication of pertussis. Haemophilus influenza immunization has also proven effective in preventing various types of diseases including pneumonia and meningitis. Through this immunization, toddlers can avoid diseases that can have serious consequences such as pneumonia (Astini, 2023).

6. The Relationship between Nutritional Status and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center, North Jakarta

Based on the research results, it is known that of the 56 respondents with good nutritional status, 29 respondents (51.8%) had no pneumonia and 27 respondents (48.2%) had pneumonia, of the 34 respondents with poor nutritional status, 8 respondents (23.5%) had no pneumonia and 26 respondents (76.5%) experienced pneumonia. Results of statistical tests carried out using *chi square* with *Continuity Correction analysis* [b] obtained *a p-value of 0.016*$<\alpha$ =0.05, so it can be concluded that there is a relationship between nutritional status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta 3. From the results of the analysis, it was obtained that the OR value

was = 3.491 ((95% CI 1.350-9.027), meaning that respondents who were malnourished had a higher chance of experiencing pneumonia.

The results of statistical tests were carried out using *chi square* with *Pearson chi square analysis* The p-value obtained was *0.622>α* = 0.05, so it can be concluded that there is no relationship between maternal employment and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta.

According to Putri (2023), toddlers with deficient or poor nutritional status have a higher risk of developing pneumonia. This condition occurs because bacteria and viruses more easily enter the body when the body's resistance or resistance decreases. Malnutrition in toddlers can weaken the immune system and respiratory muscles, making them more susceptible to pneumonia compared to toddlers with normal nutritional status. Family socio-economic factors also influence the nutritional status of toddlers, where children's nutritional intake often depends on parents' income. Parental involvement in providing nutritional intake to children is important in preventing malnutrition in toddlers.

In line with Putri's research (2018) entitled Risk Factors for Pneumonia in Toddlers in the Working Area of Cinere Health Center, Depok City in 2018, it was stated that nutritional status (95% CI: 1.552-9.242; p=0.048), immunization status (95% CI: 1.113 -6.889; p=0.044), gender (95% CI: 1.167-6.571; p=0.033), type of house floor 95% CI: 1.424-8.460; p=0.009), type of house walls (95% CI: 1.197-7.109; p=0.029), type of cooking fuel (95% CI: 1.163-8.018; p=0.036) and family smoking habits (95% CI: 1.261- 7,000; p=0.020) is related with the incidence of pneumonia in toddlers. The independent variable that influences the most is nutritional status (OR=5.530).

7. The Relationship between Maternal Education and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Public Health Center, North Jakarta

Based on the research results, it is known that of the 2 respondents with higher education, 1 respondent (50%) did not have pneumonia and 1 respondent (50.0%) had pneumonia. Of the 34 respondents with secondary education, 14 respondents (41.2) did not have pneumonia and 20 respondents (58.8%) experienced pneumonia. Of the 54 primary education respondents, 22 respondents (40.7%) did not have pneumonia and 35 respondents (59.3%) had pneumonia.

Research result obtained *a p-value of 0.966>α* =0.05, so it can be concluded that there is no relationship between education and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. This shows that maternal education is not a factor in the occurrence of pneumonia in children.

In line with research by Sari (2018) which states that education is not a factor in the occurrence of pneumonia in children under five, the chi square statistical test results were obtained (p value = 0.219) in the Hanura Community Health Center working area.

Education, both formal and non-formal, influences the way a person makes decisions and acts. A mother with higher formal education tends to be more receptive to health messages and has a better understanding of preventing and managing diseases in toddlers. Children born to mothers with a low level of education have a higher risk of suffering from pneumonia compared to children born to mothers with a higher education, the risk is more than two thousand times higher. This confirms that education has a major impact on children's health, especially in reducing the risk of diseases such as pneumonia (Sulindawati, 2018).

Education Mother No haveconnection Which significant with incidence of pneumonia in toddlers (*p* = 0.072). Matter This in accordance with study Marhamah (2018) reports that maternal education has no effect on the incidence of pneumonia in toddlers in village Bontangan Regency Enrekang. Viewed from OR, education Mother Which low risky 4 time more tall suffering from pneumonia in toddlers. Leveleducation Mother Which tall expected in line with knowledge Mother Because will

influence method maintenance to Toddler. Besides That Mother with higher education is more alert and will look for help medical more beginning if The toddler suffer ISPA.

8. The Relationship between Maternal Employment and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Community Health Center, North Jakarta

Based on the research results, it is known that of the 18 respondents whose mothers worked as civil servants/TNI/POLRI/BUMN/private sector, there were 9 respondents (50%) who did not have pneumonia and 9 respondents (50.0%) had pneumonia, of the 34 respondents who worked as entrepreneurs/traders/service workers. services there were 2 respondents (50%) who did not have pneumonia and 2 respondents (50%) had pneumonia. Of the 68 respondents who were not working mothers/housewives, 26 respondents (38.2%) had no pneumonia and 42 respondents (53.3%) had pneumonia.

Research result obtained *a p-value of 0.622>α* =0.05, so it can be concluded that there is no relationship between maternal employment and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. This shows that even working mothers have children at the same risk of pneumonia. One of the most influential factors is the age of the toddler.

In line with Rahmawai's (2017) work person old No have connection Which significant with the incidence of pneumonia in toddlers (p = 0.350). This is supported by the results analysis connection work person old with income family Which Alsothere is no significant relationship. If seenfrom OR so Toddler with family Which Work Non Civil servants have the possibility of having income The same big with Toddlers in the family Which Work as Civil servants (OR = 1,353). With income Which The same big then the Toddler's parents can provide health care and nutrition children _ adequate.

9. The Relationship between Access to Health Services and the Incidence of Pneumonia in Toddlers at the Kalibaru Cilincing Sub-Puskesmas, North Jakarta

Based on the research results, it is known that of the 84 respondents who had access to health services <1 km, 34 respondents (40.5%) had no pneumonia and 50 respondents (59.5%) had pneumonia, of the 6 respondents who had access to health services 1-5 km, there were 3 respondents (50 %) not pneumonia and 3 respondents (50%) had pneumonia.

Research result obtained *a p-value of 0.977>α* = 0.05, so it can be concluded that there is no relationship between access to health services and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. The results of this study show that the incidence of pneumonia in urban areas is also higher than in rural areas, this also occurs because the most dominant factor causing pneumonia is age under five with an OR value = 3.560 ((95% CI 1.254-10.101).

In line with emblematic research (2019) entitled Factors Associated with Maternal Behavior in Preventing Recurrent Pneumonia in Toddlers (Case Study in the Work Area of the Getasan Health Center, Semarang Regency) stated that the research results showed that there was no relationship between access to health services (p=0.223) and access to information and husband's support are not related to maternal behavior in preventing recurrent pneumonia in toddlers in the Getasan Community Health Center working area.

10. Relationship between area of residence and the incidence of pneumonia in toddlers at the Kalibaru sub-district health center Cilincing, North Jakarta

Based on the research results, it is known that of the 89 respondents in urban areas, 37 respondents (41.6%) did not have pneumonia and 52 respondents (58.4%) had pneumonia. Of the 1 respondent living in a rural area, 1 respondent (100%) experienced pneumonia.

Research test results obtained *a p-value of 1,000>α* = 0.05, so it can be concluded that there is no relationship between the area of residence and the incidence of pneumonia at the Kalibaru Cilincing

sub-district health center, North Jakarta. This is because in this study the research locus was in urban areas so this research is not in line with Lee's (2020) theory that babies or toddlers who live in remote areas or far from health facilities are at higher risk of developing pneumonia. Delays in getting medical help can make the pneumonia condition worse. This condition can cause delayed treatment and increase the risk of serious complications or the severity of pneumonia in children.

Conclusion

1. The incidence of pneumonia at Pustu Kalibaru Cilincing was that the majority of respondents, 53 (58.9%) of respondents experienced pneumonia and almost 37 (41.1%) of respondents did not experience pneumonia.
2. The characteristics of respondents in the Kalibaru Sub-Public Health Center area, North Jakarta, namely that of the 90 respondents, the majority of respondents 70 (77.8%) were aged 2-11 months, the majority of respondents 56 (62.2%) were male, the majority of respondents 70 (77.8%) had not received complete immunization, most of the respondents 56 (62.8%) had good nutritional status, most of the respondents 68 (75.6%) did not work / were housewives. the majority of respondents 84 (93.3) <1km and a small number of respondents 6 (6.7%) 1-5 km and in general 89 respondents (98.9) in urban areas and 1 respondent (1.1%) in rural areas.
3. There is a relationship between toddler age and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, it was obtained that the OR value = 3.560 ((95% CI 1.254-10.101), meaning that respondents aged 2-11 months had a higher chance of experiencing pneumonia.
4. There is a relationship between gender and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, it was obtained that the OR value was = 3.277 ((95% CI 1.347-7.975), meaning that respondents who were male had a higher chance of experiencing pneumonia.
5. There is a relationship between immunization status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta 3. From the results of the analysis, it was obtained that the OR value was = 3.560 ((95% CI 1.254-10.101), meaning that respondents whose immunizations had not been completed had a higher chance of experiencing pneumonia.
6. There is a relationship between nutritional status and the incidence of pneumonia at the Kalibaru Cilincing sub-district health center, North Jakarta. From the results of the analysis, it was obtained that the OR value was = 3.491 ((95% CI 1.350-9.027), meaning that respondents who were malnourished had a higher chance of experiencing pneumonia.
7. There is no relationship (education, maternal occupation, access to health services, and area of residence) with the incidence of pneumonia in Kalibaru sub-district health centers Cilincing, North Jakarta.

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