



## Incident Pneumonia In Toddler With The Physical Environment Of The Home Does Not Meet The Requirements

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### ABSTRACT

Globally, pneumonia is one of the diseases that causes morbidity and mortality in low-income countries. Pneumonia is a major cause of death in toddlers and young children. Bacteria, viruses, and fungi are pathogenic agents and play a role in causing pneumonia. The etiology of pneumonia varies based on epidemiological circumstances, comorbidities and whether the pneumonia is community-acquired or hospital-acquired. The aim of this study was to analyze the relationship between the physical environment of the home and the incidence of pneumonia in toddlers in villages. This type of research is analytical quantitative research with a cross-sectional study approach with a sampling technique, namely simple random sampling. Data collection techniques use observation sheets. The data analysis used was univariate analysis and bivariate analysis with the Chi Square test. The results of this study can be concluded that there is a relationship between housing density and the incidence of pneumonia in toddlers. It is expected that the Health Center will always monitor the development of pneumonia cases in toddlers that occur in the Work Area of the Health Center which are caused by the physical environment of the house that does not meet the requirements.

**Keywords:** Pneumonia Incidence, Toddlers, Physical Environment, Houses Do Not Meet Requirements, Health Center Work Area

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## 1. Introduction

Pneumonia is a form of acute lower respiratory tract infection that specifically affects the lungs. The lungs consist of thousands of bronchi which divide into airways (bronchioles) which end in small sacs (alveoli). The alveoli contain capillaries where oxygen is added to the blood and carbon dioxide is removed. When a person has pneumonia, pus and fluid fill the alveoli in the lungs which interferes with oxygen absorption, making it difficult to breathe.

Pneumonia is a common, widespread, infectious lung disease that causes inflammation, which can lead to reduced oxygenation, shortness of breath, and death. Pneumonia infects the respiratory tract and attacks the lungs. Pneumonia is a disease that can generally attack all economic strata, especially in the age group of children under five years or toddlers. Environmental-based diseases such as pneumonia are highly correlated with the physical conditions of the home environment such as temperature and humidity.

The incidence of pneumonia in several developing countries such as in African countries is estimated to reach 0.33 episodes per child each year and in other eastern countries it is estimated to reach 0.29 episodes per child or 151.8 million new cases each year. There are 15 countries with the highest predicted new cases and incidence of pneumonia in children and toddlers covering 74% (115.3 million) of the 156 million cases worldwide. More than half of pneumonia cases are focused in 6 countries, including India 43 million, China 21 million, Pakistan 10 million, Bangladesh, Indonesia and Nigeria each 6 million cases per year, from the six countries covering 44% of the world's child and toddler population.

World Health Organization (WHO) Acute respiratory infections including pneumonia cause 1.4 million child deaths worldwide, accounting for 18% of all child deaths. Despite the difficulty of generating estimates with available evidence, pneumonia has consistently been estimated as a major cause of child death. Low- and lower-middle-income countries are home to 62% of the world's population under 5 years of age, but account for more than 90% of global pneumonia and diarrheal deaths.





Bacteria are a major cause of very severe pneumonia in developing countries. *Staphylococcus aureus* and *Streptococcus pneumoniae* are the main causes of community-acquired bacterial pneumonia while gram-negative bacteria, which are often resistant to multiple antibiotics, are a common cause of hospital-acquired pneumonia and pneumonia in immunosuppressed individuals.

Pneumonia in Indonesia ranks second as the leading cause of infant and toddler mortality (12.3 %) after diarrhea. Pneumonia is a serious health problem and is the cause of 15.3 % of post-neonatal deaths in toddlers aged 29-11 months, and causes the second highest number of deaths in toddlers aged 12-59 months 10.7%. Pneumonia in 2020 contributed to deaths in the group of children aged 29 days -11 months and was the main problem causing 73.9% of deaths due to pneumonia and 14.5% of deaths due to diarrhea.

*S. pneumoniae* is the most common pathogenic bacteria affecting children and adults in the community. Bacteria that cause pneumonia in children are the streptococcus group, *S.aureus*, *M.catarrhalis*, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae*. Children with bacterial pneumonia are characterized by symptoms such as fever, malaise, rapid breathing, cough and chest pain.

Pneumonia is the third leading cause of death in toddlers at 9.4 % of the total number of toddler deaths. It is estimated that 2-3 toddlers die every hour due to pneumonia. The number of toddler pneumonia cases reported in 2014 was 600,682 cases and 32,025 were severe pneumonia (5.3%). Of 100 toddlers with pneumonia, it is estimated that 3 of them died, if they suffer from severe pneumonia the risk of death is greater, it can reach 60% especially in infants (7). Based on the 2012 Indonesian Demographic Health Survey (SDKI), the Toddler Mortality Rate (AKABA) and child mortality were 40 and 9 deaths per 1000 births respectively.

## 2. Research Methods

The research uses an observational analytical research method with a cross-sectional survey approach. The variables studied in this study are temperature and humidity variables associated with pneumonia in toddlers. The research location was





conducted in the Tiakur Health Center Working Area. The data in this study include primary data and secondary data.

The number of samples that were interviewed, measured and observed in the toddler's room environment in this study was 100 toddler samples, both those who had been diagnosed with pneumonia and those who had not. The sampling technique was carried out through a random process using the Simple Random Sampling technique to provide an opportunity for the entire population to be selected for sampling and to describe the actual state of the population. The independent variables studied in this study were variables related to the physical environmental factors of the house, namely temperature and humidity.

The humidity category that meets health standards is 40% - 60% Rh and the humidity category that does not meet health standards is 60% Rh. The data analysis process was carried out using statistics with the chi-square test ( $\alpha = 0.05$  and 95% CI).

### 3. Results and Discussion

#### a. Results

Table 1

Frequency Distribution of the Relationship between Home Occupancy Density and the Incidence of Pneumonia in Toddlers

No	Density of Residential Housing	Pneumonia in Toddlers				Total		OR (CI 95%)	p value
		Yes		No		n	%		
		n	%	n	%				
1	Not eligible	6	8.2	67	91.8	73	100	,130 (,042 – ,405)	0,000
2	Qualify	11	40.7	16	59.3	27	100		

Table 1 shows that out of 73 respondents whose housing density did not meet the requirements, 6 suffered from pneumonia in toddlers (8.2 %). Meanwhile, out of 27 respondents whose housing density met the requirements, 11 suffered from pneumonia in toddlers (40.7 %).

#### b. Discussion

The density of occupancy in a house according to the Decree of the Minister of Health of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 concerning the





requirements for a healthy house is a maximum of 2 people/8m<sup>2</sup>. Criteria that meet health requirements can be useful for preventing the spread of disease and can facilitate daily life activities. Dense living conditions can increase existing indoor pollution factors.

Residential density is the result of dividing the area of a room by the number of occupants in a house. The area of a house that is not comparable to its occupants will result in high residential density (Jendra, 2015). The need for space per person can be calculated based on the basic activities carried out by humans in activities at home.

Residential density can also affect indoor air quality, residential density is said to be the cause of indoor physical pollution because residential density affects room temperature. In addition, residential density can cause high levels of CO<sub>2</sub> indoors, while CO<sub>2</sub> is one source of chemical air pollutants (Ministry of Health of the Republic of Indonesia, 2013).

According to the researcher's assumption, the level of housing density that does not meet the requirements can be at risk of pneumonia, caused by dense housing conditions that cause the air temperature in the house to increase and the house feels hotter. The denser the occupants of the house, the easier and faster the transmission of disease, especially airborne diseases, will be, especially in toddlers who are susceptible to disease transmission.

Therefore, a house that is not densely populated can reduce the risk of pneumonia in toddlers. While respondents whose housing density meets the requirements but experience pneumonia because of the tendency to live more at home with worse physical conditions such as not cleaning windows from dust and cobwebs, not cleaning floors, not adding glass or ventilation so that the room in the house becomes damp and stuffy, and the humidity of the house can be affected by poor house construction.





#### 4. Conclusion

The results of the study conducted on "Incidence of Pneumonia in Toddlers with a Home Physical Environment that Does Not Meet Requirements" can be concluded that: Most toddler homes have a housing density that does not meet requirements and most cases of pneumonia in toddlers.

The researcher would like to express his gratitude to the Head of the Institute for Research and Community Service, lecturers, and friends who have helped a lot in the process of this research. Hopefully this research can be useful and become useful knowledge.

#### 5. Compliance with ethical standards

##### Acknowledgements

The researcher would like to thank the head of the health center and his staff, as well as all parties who have helped carry out this research. Therefore, the researcher hopes that there will be more services that can help the community to be healthier and avoid pneumonia.

##### Disclosure of conflict of interest

This research collaboration is a positive thing for all researchers so that conflicts, problems and others are absolutely no problem for all writers.

##### Statement of informed consent

Every action we take as authors is a mutual agreement or consent.

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