



## THE EFFECTS OF FAMILY SMOKING HABITS ON BRONCHOPNEUMONIA INCIDENCE AMONG TODDLERS

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### ABSTRACT

**Background:** Bronchopneumonia, one of the variants of pneumonia that commonly affects the bronchi and alveoli, especially in toddlers, is often caused by exposure to cigarette smoke in the surrounding environment. In 2019, there were 2,157 cases of bronchopneumonia in toddlers in Aceh Province. The presence of family members who smoke increases the risk of bronchopneumonia in toddlers because cigarette smoke can disrupt lung defense mechanisms. This research aims to determine the influence of family members' smoking behavior on the incidence of bronchopneumonia in toddlers in the pediatric ward of RSUD dr. H. Yuliddin Away Tapaktuan, South Aceh.

**Methods:** This research design is quantitative with a cross-sectional study approach. The study population consisted of 71 toddlers, with 41 respondents selected as samples using purposive sampling technique. The study was conducted from February 7 to 15, 2024, using interview instruments and examination sheets to assess bronchopneumonia criteria. Data analysis was performed using the chi-square test at a significance level of 0.05 to examine the effect of family smoking habits on the incidence of bronchopneumonia.

**Results:** The research findings indicate that the average family members of toddlers who smoked the most were the toddlers' parents, with a percentage of 56%, and smoking habits indoors reached 68.3%, while the proximity of smokers to toddlers reached 90.2%. The chi-square test analysis showed the influence of family members' smoking behavior on the incidence of bronchopneumonia in toddlers, with a p-value of 0.007 ( $\alpha = 0.05$ ).

**Conclusion:** The smoking behavior of family members can cause respiratory disorders in toddlers and thus increasing the risk of bronchopneumonia

**Keywords:** *Smoking Behavior, Family, Toddlers, Bronchopneumonia.*

## INTRODUCTION

The toddler period is an important stage in the growth and development process. The growth and development of toddlers are crucial factors for the success of children's growth and development in the future. Toddlers are often referred to as the golden period during which their growth and development need to be carefully monitored to prevent health problems<sup>[1]</sup>.

One of the leading causes of mortality in toddlers due to infectious diseases is pneumonia. The vulnerable population affected are children under the age of 2<sup>[2]</sup>. Bronchopneumonia is one type of pneumonia that affects the bronchi and alveoli and is most common in toddlers under 5 years old. Symptoms of bronchopneumonia start with respiratory tract infections and tend to lead to secondary infections, although pneumonia can also cause primary infections in immunocompromised individuals<sup>[3]</sup>.

Pneumonia has become one of the leading causes of death in children worldwide, earning it the title of the leading killer of children worldwide<sup>[4]</sup>. According to UNICEF data (2021), more than 700,000 toddlers die each year, equating to around 2,000 children per day. Globally, pneumonia occurs at a rate of 1 case per 71 children each year, with the highest incidence in South Asia, West Africa, and Central Africa. Children with weakened immune systems due to malnutrition or those living in highly polluted air environments are at significantly higher risk of contracting pneumonia<sup>[5]</sup>.

In Indonesia, based on data from Kementerian Kesehatan (2022), pneumonia cases continue to pose a public health issue, particularly among toddlers. In 2021, the mortality rate among children aged 12-59 months due to bronchopneumonia was (9.4%), with a national coverage rate of (31.4%). The highest number of pneumonia-related deaths occurred in Nusa Tenggara Barat

(6.38%), Bangka Belitung (6.05%), and Jawa Barat (4.62%)<sup>[6]</sup>. Meanwhile, in Aceh Province in 2019, pneumonia cases ranked second highest, with 2,157 pneumonia patients aged 1-4 years old<sup>[7]</sup>.

The occurrence of bronchopneumonia in toddlers is caused by the influence of environments contaminated with cigarette smoke. The presence of family members who smoke can increase the risk of respiratory disorders in toddlers. Toddlers with bronchopneumonia will exhibit symptoms such as fever, productive cough, and shortness of breath due to mucus accumulation in the respiratory tract<sup>[8]</sup>.

The habit of family members smoking indoors affects the incidence of pneumonia in toddlers. Children from smoking households are more likely to suffer from respiratory disorders compared to children from non-smoking households. Exposure to cigarette smoke can disrupt lung defense function in toddlers through cilia dysfunction, leading toddlers who inhale cigarette smoke to develop acute respiratory infections (ARI) and increase the risk of bronchopneumonia<sup>[9]</sup>.

Exposure to cigarette smoke indoors is a major factor of indoor air pollution that causes respiratory diseases, especially among toddlers<sup>[10]</sup>. Inhaled cigarette smoke disrupts cilia function, leading to increased mucus production and respiratory tract infections<sup>[11]</sup>. The habit of smoking among family members contributes to exposure to carbon monoxide gas indoors and causes lung diseases, weakening the immune system of toddlers, making them susceptible to pneumonia<sup>[12]</sup>.

In line with the findings of research conducted by Khodijah (2020), which showed a significant association between family members' smoking behavior and the occurrence of bronchopneumonia in toddlers, due to a lack of awareness in managing smoking

environments that can lead to the risk of this disease<sup>[13]</sup>.

Based on the aforementioned background, the researchers are interested in examining the influence of family members' smoking behavior on the occurrence of bronchopneumonia in toddlers in the pediatric ward of RSUD dr. H. Yuliddin Away Tapaktuan, South Aceh. Through this research, it is hoped to provide a deeper understanding of the impact of family members' smoking on children's health and to identify effective strategies to reduce the risk of bronchopneumonia in toddlers.

**METHODS**

This research is a quantitative study conducted using a cross-sectional approach. The main objective of this study is to investigate the influence of family members' smoking behavior on the occurrence of bronchopneumonia in toddlers. This method was chosen because it allows for the simultaneous observation of the relationship between the independent variable (family members' smoking behavior) and the dependent variable (occurrence of bronchopneumonia in toddlers) in a single measurement.

The study population consists of 71 toddlers who were treated in the pediatric ward of RSUD dr. H. Yuliddin Away during the last three months, namely October, November, and December 2023. From this population, a sample of 41 toddlers was selected using purposive sampling method. The inclusion criteria for sample selection include toddlers diagnosed with bronchopneumonia, having family members who smoke, and families willing to participate as respondents.

Data collection was conducted from February 7th to February 15th, 2024. The data collection methods included filling out questionnaires by accompanying respondents and examining toddlers' medical records based on

bronchopneumonia diagnosis. After data collection, statistical analysis will be performed using the chi-square test to identify any significant influence of family members' smoking behavior on the occurrence of bronchopneumonia in toddlers.

**RESULT**

In these research findings, the characteristics of respondent data, the frequency distribution of family members' smoking behavior data, the frequency distribution of bronchopneumonia occurrence data in toddlers, and the data analysis on the influence of family members' smoking behavior on bronchopneumonia occurrence will be explained. The research results can be viewed in the following table.

**Table 1.** Distribution of Respondent Characteristics (n=41)

Characteristics	Frequency	Percentage
Age		
2 years	1	2,4
3 years	13	31,7
4 years	16	39,0
5 years	11	26,8
Gender		
Male	19	46,3
Female	22	53,7
The toddlers companion		
Parent	32	78,0
Family	9	22,0
Parents education		
High school	26	63,4
University	15	36,6
Smokers living in the house		
Parents		
Family members	23	56,0
	18	44,0
Proximity of Smokers to Toddlers		
Near	4	9,8
Very near	37	90,2

Characteristics	Frequency	Percentage
Familial smoking habit		
Inside the house	28	68,3
Outside the house	13	31,7
Family smoking behavior per day		
< 5 sticks	6	14,6
5-10 sticks	27	65,9
>10 sticks	8	19,5

Based on the research results in the table above, it is found that out of a total of 41 respondents, the majority of toddlers have an average age of about 4 years, with 16 respondents (39.0%), and the majority of them are female, totaling 22 respondents (53.7%). Most toddlers are accompanied by their parents during hospitalization, with 32 respondents (78.0%). The majority of respondents' parents have a secondary education, with 26 respondents (63.4%). Most of the smoking family members are the toddlers' parents, totaling 23 respondents (56.0%). The proximity of smokers to toddlers is mostly very near, with 37 respondents (90.2%). Most families smoke indoors, with 28 respondents (68.3%), and in terms of family smoking behavior per day, the majority consume 5 to 10 sticks of cigarettes, comprising 27 respondents (65.9%).

**Table 2.** Distribution of Family Members Smoking Behavior (n=41)

Characteristics	Frequency	Percentage
Exposes to cigarette smoke	25	61,0
Does not exposes	16	39,0

Based on the table above, it can be seen that out of 41 respondents, the majority of family members' smoking behavior involves exposing toddlers to cigarette smoke, with a total of 25 respondents (61.0%), while 16 respondents (39.0%) do not expose them to cigarette smoke.

**Table 3.** Distribution of Bronchopneumonia Occurrence in Toddlers (n=41)

Characteristics	Frequency	Percentage
No bronchopneumonia	11	26,8
Bronchopneumonia	21	51,2
Severe bronchopneumonia	9	22,0

Based on the table above, it can be seen that out of a total of 41 respondents, the majority of toddlers experienced a disease prognosis with the category of bronchopneumonia, with a total of 21 respondents (51.2%), while 11 respondents (26.8%) were classified as non-bronchopneumonia, and 9 respondents (22.0%) were classified as severe bronchopneumonia.

**Table 4.** Analysis of the Influence of Family Members' Smoking Behavior on Bronchopneumonia Occurrence in Toddlers (n=41)

Family Members Smoking Behavior	Occurrence of Bronchopneumonia						Total		P-Value
	Non		Broncho		Severe		n	%	
Exposes	11	26,8	9	22,0	5	12,2	25	61	0,007
Does not exposes	0	0	12	29,3	4	9,8	16	39	

Based on the table above, it can be seen that out of 41 respondents, 25 respondents had family members who exposed toddlers to cigarette smoke, which influenced the occurrence of bronchopneumonia in 9 respondents (22%), severe bronchopneumonia in 5 respondents (12.2%), and non-bronchopneumonia in 11 respondents (26.8%). The chi-square analysis results indicate a significant influence between family members' smoking behavior and the occurrence of bronchopneumonia in toddlers, with a p-value of  $0.007 < \alpha$  (0.05).

## DISCUSSION

Toddlers are one of the vulnerable groups susceptible to pneumonia. Toddlers under 2 years of age are more likely to develop bronchopneumonia, as their immune system is not yet fully developed, making them more susceptible to bronchopneumonia<sup>[14]</sup>. The research findings in Table 1 indicate that out of 41

respondents, the majority of toddlers who experienced bronchopneumonia were aged 4 years, with 16 respondents (39.0%), followed by 13 respondents (31.7%) aged 3 years, 11 respondents (26.8%) aged 5 years, and 1 respondent (2.4%) aged 2 years.

Bronchopneumonia is a symptom of acute infection that occurs in the lung tissue (alveoli), and its occurrence in toddlers often coincides with acute infection processes in the bronchi<sup>[14]</sup>. The occurrence of bronchopneumonia in toddlers is associated with various risk factors, both directly and indirectly contributing to bronchopneumonia in toddlers. Generally, there are three factors contributing to pneumonia in children: environmental factors including indoor air pollution, child health factors such as age, nutritional status, and immunization status, and behavioral factors related to disease prevention and treatment in the family<sup>[15]</sup>. In toddlers, cigarette smoke indirectly contributes to lung disease and weakens the toddler's immune system. When the toddler's immune system weakens due to exposure to cigarette smoke, they become more susceptible to bacterial pneumococcal infections such as pneumonia<sup>[16]</sup>.

From the research findings, it is evident that the majority of parents of toddlers have a middle-level education, totaling 26 respondents (63.4%). Family members who smoke predominantly include the toddler's parents, totaling 23 respondents (56.0%). The proximity of smokers to toddlers is very close, with 37 respondents (90.2%). The majority of families have a smoking habit indoors, with 28 respondents (68.3%). Family members' smoking behavior largely exposes toddlers to cigarette smoke, with 25 respondents (61.0%), and there were 21 respondents (51.2%) who experienced bronchopneumonia prognosis.

The habit of family members smoking indoors poses a concerning issue for toddler health. The presence of

smoking family members indoors is a contributing factor to respiratory problems, increasing the risk of upper respiratory tract infections that may lead to bronchopneumonia. Parental smoking behavior escalates the risk of children being more susceptible to respiratory illnesses such as flu, asthma, pneumonia, and other respiratory tract diseases<sup>[11]</sup>.

The smoking behavior of family members accelerates respiratory problems in toddlers, as the air pollution from cigarette smoke irritates the respiratory system of toddlers. The more cigarette smoke the toddler is exposed to and inhales, the worse their health becomes in indoor spaces. Parental and family knowledge of toddlers is a crucial domain that needs to be established to shield their family members from health issues. Behavior can be shaped based on knowledge, awareness, and good attitudes; thus, good behavior will lead to better practices in maintaining their family's health from sources of diseases.

The research data analysis results indicate a significant influence of family members' smoking behavior on bronchopneumonia occurrence in toddlers, with a p-value of  $0.007 < \alpha (0.05)$ . The researcher assumes the influence of both variables due to the presence of inadequate parental and family behavior in safeguarding toddler health. It is observed that parents and family members still exhibit behaviors exposing toddlers to cigarette smoke, leading to respiratory disturbances, with bronchopneumonia incidence in toddlers at 51.2%. Additionally, toddlers' proximity to smokers is close, increasing the likelihood of respiratory system disturbances due to family smoking behavior. Smoking habits within the household pose risks to its members, especially with family education predominantly at the junior and senior high school levels, possibly indicating unawareness of the serious consequences of smoking behavior near toddlers, thereby increasing the likelihood

of respiratory disturbances and bronchopneumonia.

In line with research conducted by Milo et al. (2015) on the relationship between smoking habits at home and acute respiratory infections (ARI) in children aged 1-5 years at the Sario Public Health Center in Manado City, involving 51 respondents, the study found a significant association between smoking habits and ARI incidence in children ( $p$ -value=0.002). Most respondents exhibited heavy smoking habits, with 22 respondents (43.1%) categorized as heavy smokers<sup>[17]</sup>.

Another study conducted by Astini et al. (2020) on parental smoking habits and pneumonia incidence in toddlers at Wangaya Hospital in Denpasar involved 56 toddlers. The research findings indicated that parents with smoking habits were typically aged 30 years, had completed high school education (50%), were current smokers (62.5%), had smoked for less than 10 years (44.6%), and were active smokers (62.5%). The chi-square test and multiple logistic regression yielded  $p$ -values of 0.024, and the variable most associated with the outcome was the type of smoker, with an odds ratio of 19.00<sup>[18]</sup>.

The presence of family members who smoke is a contributing factor to health issues within the family, such as respiratory disturbances that can exacerbate respiratory tract infections and pose a serious problem regarding bronchopneumonia.

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### CONCLUSION

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The study demonstrates a significant influence of family members' smoking behavior on bronchopneumonia occurrence in toddlers in the pediatric ward of BLUD RSUD dr. H. Yuliddin Away, Tapaktuan, South Aceh. Based on the research findings, it is recommended that parents and extended family members of toddlers should alter their smoking behavior, especially by quitting smoking

and keeping toddlers away from cigarette smoke exposure, which can disrupt the toddlers' respiratory system due to air pollution from smoking, thus ensuring the toddlers' health and reducing the risk of bronchopneumonia occurrence.

Future research should delve deeper into the effectiveness of smoking cessation programs among family members of toddlers and explore innovative approaches to minimize toddlers' exposure to cigarette smoke within household environments, thus providing more comprehensive strategies to prevent bronchopneumonia in toddlers.

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