

THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS OF TODDLERS AND FAMILY SMOKING BEHAVIOR WITH THE INCIDENCE OF PNEUMONIA IN TODDLERS IN THE WORKING AREA OF CANDI PUBLIC HEALTH CENTER

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ABSTRACT

Pneumonia is the most prevalent and possibly fatal respiratory illness among children under five. The purpose of this study is to look at the connection between family smoking habits, nutritional status, and the prevalence of pneumonia in children under five in the Candi Health Center's working region. 43 families with children ages 0 days to under 5 years who sought treatment at the Candi Health Center were chosen using the sequential sampling technique. This study employs descriptive analysis and a cross-sectional methodology. 86% of participants in the research had acceptable nutritional status. Furthermore, according to 80% of families, at least one person smokes at home. Bivariate analysis using the Chi-Square Test revealed no significant correlation between the incidence of pneumonia and baby nutritional health ($p=0.190$); nevertheless, there was a high correlation between the incidence of pneumonia in infants and family smoking ($p=0.000$). Toddlers' health is negatively impacted by family smoking practices, particularly because it raises their risk of pneumonia. Families with small children should know how important it is to keep smoking away from them, safeguard their health, and take them to the doctor on a regular basis for exams.

Keywords: *Pneumonia, Family Smoking Behavior, Nutritional Status, Toddlers*

Introduction

Cases of pneumonia are more common and are associated with relatively high mortality rates in developing countries. According to WHO data for 2021, pneumonia killed 740,000 young children under the age of five, which represents 14% of all infant deaths worldwide (WHO, 2022). In terms of infant and child mortality from pneumonia, Indonesia ranks eighth globally out of 15 countries. In Indonesia, 278,261 children were infected with pneumonia in 2021. Although this figure is 10.19% lower compared to the 309,838 cases reported in the previous year, this figure remains quite high (Sumarni & Rasyidah, 2023).

Ten provinces had the highest number of pneumonia cases in children under five years of age in 2023 out of 34 provinces that reported cases. East Java recorded 76,929 cases of pneumonia in toddlers in 2023, making it the province with the highest incidence in Indonesia (Indonesian Ministry

of Health, 2023).

In 2021 in Sidoarjo regency, pneumonia affected a total of 8,355 toddlers. The number of babies suffering from pneumonia increased to 10,276 in 2022 compared to the previous year. In 2023, Sidoarjo regency reported 9,567 babies affected by pneumonia, there was a small decrease compared to the previous year (Sidoarjo regency Health Office, 2022, 2023).

Data from the Sidoarjo health profile at the Candi Health Center shows that there are 188 toddlers suffering from pneumonia in 2022. The Candi Health Center experienced an increase in pneumonia cases in toddlers in 2023 compared to the previous year, with 468 infected toddlers, placing it in second place in Sidoarjo (Sidoarjo regency Health Office, 2022, 2023).

Pneumonia remains a serious global health problem for children. The most common or always

occurring symptoms in toddlers are coughing, shortness of breath, and symptoms of severe pneumonia, such as the lower chest wall pressing inward when breathing. Another significant risk factor is from exposure to cigarette smoke. Cigarettes can damage children's lungs, not only harmful to their own health. According to statistics, pneumonia is often affected a lot in children whose parents smoke compared to children whose parents do not smoke (Ministry of health of Indonesia, 2023).

There are several ways of spreading pneumonia. Children can breathe air that contains bacteria and viruses that can infect their lungs if they do. Saliva from sneezing or coughing can spread these bacteria and viruses. Pneumonia through blood circulation can spread, especially during and immediately after delivery. Coughing and / or difficulty breathing, with or without fever, are symptoms in toddlers. Rapid breathing or an inward pull on the lower chest wall when the chest moves inward or inward while breathing are signs of pneumonia (World Health Organization, 2022).

Malnutrition can damage a child's immune system, especially if the baby is not exclusively breastfed. HIV, measles, and other pre-existing diseases can make a child more susceptible to pneumonia. Environmental factors, such as children living in densely populated homes, parents actively smoking near children, and indoor air pollution due to the use of biomass such as wood or dirt, can also make children more susceptible to pneumonia (World Health Organization, 2022).

Human actions such as smoking are the main cause of pneumonia. According to DEA Safitri's research, toddlers living with families actively inhaling cigarettes have a 3.116 times greater risk of becoming infected with pneumonia than children not living with families actively smoking (Safitri, 2023).

One of the risk variables that can affect the likelihood of toddlers getting sick is their nutritional status. According to a 2019 study by Nuraeni and Rahmawati in Indramayu, toddlers with nutritional conditions are 6.5 times more likely to be infected with pneumonia than toddlers with proper nutrition (Wiralodra et al., 2019).

Method

With 1,185 children in the Candi Health Center's service area, ages 0 days to under 5 years, who came for treatment, the study's design is cross-sectional and descriptive with a correlation study model. By distributing nutritional status questionnaires based on KMS and family smoking habits in the house according on the following criteria, this study used the sequential sampling

technique:

1. Families who visit the Temple Health Center with toddlers (ages 0 days to less than 5 years) who are open to taking part in the study.

The Slovin formula is used to determine the sample size. For this survey, forty-three respondents will take part. The respondents' consent is obtained before the data is gathered, and their

Result

4.1 General Data

1. Distribution of characteristics of parents of toddlers who became respondents who came to the Candi Health Center in March 2025

Table 4.1 Distribution Of Characteristics Of Parents Who Became Respondents In March 2025 At The Candi Health Center

Characteristics of Respondents	Frequency (n)	Percentage (%)
Age		
20-29 years old	4	10
30-39 years old	23	54
40-49 years old	14	32
>50 years	2	4
Last Education		
Elementary School	2	4
Junior High School	5	12
SeniorHigh School	19	44
Diploma	9	21
Bachelor	8	19
Jobs		
Self-employed	6	13
Farmers	0	0
PNS	7	15
Private	11	27
Does not work	16	39
Others	3	6
Gender		
Men	10	24
Female	33	76

Source: Primary Data

According to the table, 54% of parents of toddlers who visited the Candi Health Center belong to the age range from 30 to 39 years. According to data from the Candi Health Center, 44% of parents of toddlers are in the SMA / SMK category, making it the largest group. At 39%, The Lion's share of parents of toddlers are housewives and do not work.

2. Distribution Of Sex Characteristics Of Toddlers

Table 4. 2 Gender Distribution Of Toddlers In March 2025 At The Candi Health Center

Gender	Frequency (n)	Percentage (%)
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Men	34	80
Female	9	20
Total	43	100

Source: Primary Data

The majority of toddlers in this data were male, accounting for up to 34 toddlers, or 80% of the total number.

4.2 Special data

1. Distribution of Nutritional Status of toddlers in the Working Area of Candi Health Center

Table 4. 3 distribution of Nutritional Status Of toddlers in March 2025 at Candi Health Center

Category	Frequency	Percentage
Nutritional Status	(n)	(%)
Below the red line	6	14
Green line	37	86
Above the dark green line	0	0
Total	43	100

Source: Primary Data

With a proportion of 86%, the table data shows that almost all toddlers fall into the normal status group on the Green Line.

2. Distribution of Family Smoking behavior of toddlers in the House

Table 4. 4 Distribution Of Smoking Behavior Of Toddler Families In March 2025 At Candi Health Center

Family Smoking Behavior	Frequency (n)	Percentage (%)
No Smoking	9	20
Smoking	34	80
Total	43	100

Source: Primary Data

Data show that families with young children have a tendency to smoke indoors. According to data, up to 80% of families under five report smoking at home.

3. Distribution of pneumonia in toddlers in the area of the Candi Health Center

Table 4.5 Distribution Of Pneumonia In Toddlers In March 2025 At Candi Health Center

Pneumonia In Toddlers	Frequency (n)	Percentage (%)
Not Pneumonia	6	14
Pneumonia	37	86
Total	43	100

Source: Primary Data

The majority of children who visit the Temple

Health Center develop pneumonia, according to available data. A total of 37 toddlers overall, or 86% of the total, had pneumonia

4. Relationship of nutritional status of children under five with pneumonia incidence in children under five in the working area of Candi Health Center

Table 4. 6 Relationship Of Nutritional Status Of Toddlers With Pneumonia Incidence In Toddlers In March 2025 At Candi Health Center

Category Nutritional Status	Penumonia In Toddlers				Total	
	Not Pneumonia		Pneumonia			
	n	%	n	%	n	%
Below the red line	2	5	4	11	6	16
Green line	4	11	33	73	37	84
Total	6	1	37	84	43	100

Source: Primary Data

To evaluate the relationship between the nutritional status of toddlers with the incidence of pneumonia in the work area of the Candi Health Center, a 2x2 contingency table was developed. According to the test findings, 1 cell does not meet the chi-square test criteria because the expected value is less than 5 and the result is $Asimp.sig > 0.05$ indicates that the value does not comply with the requirements of the chi-square test. The chi-square test was replaced by another alternative test, the fisher test, because the table had become 2x2. The result is then greater than 0.05, as indicated by an asymptotic signifinance value of 0.190. Thus, the value of p value=0.190 is derived from the significant level of 5%. This showed that H_0 was accepted and H_a was rejected, indicating that there was no relationship between the incidence of pneumonia in toddlers and nutritional status in the work area of the Candi Health Center.

5. Relationship of family smoking behavior with the incidence of pneumonia in toddlers in the work area of Candi Health Center

Table 4.7 Relationship Between Family Smoking Behavior And Pneumonia Incidence In Toddlers In March 2025 At Candi Health Center

Family Smoking Behavior	Penumonia In Toddlers				Total	
	Not Pneumonia		Pneumonia			
	n	%	n	%	n	%
No Smoking	6	17	2	5	6	22
Smoking	0	0	33	78	35	78
Total	6	17	35	83	41	100

Source: Primary Data

Contingency table 2x2 in Table 4.7, was made to evaluate the relationship between family smoking habits and the incidence of pneumonia in toddlers in the work area of the Candi Health Center. According to the results of the chi-square test, the number still meets the requirements of the chi-square test because the asymptotic significance is less than 0.05. However, because there is an expected value of less than 5 as well as it was found that there is 1 cell does not meet the requirements of the chi-square test. The overall chi-square test result is not qualified if the expected value of the contingency table is less than five and more than twenty percent of the entire contents of the row or column merging cells. Therefore, the table can be made simpler, but since it is now 2x2, the Fisher test is an additional alternative test.

Asymptotic Value is determined after the test obtained is the value of $\text{Asymp.sig } 0.000$ which indicates that the result is less than 0.05. Thus, the value of $p \text{ value} = 0.000$ is achieved from a significant level of 5%. This shows that there is a relationship between family smoking habits and the incidence of pneumonia in toddlers in the work area of the Candi Health Center, because H_0 was rejected and H_a was accepted.

Discussion

1. Distribution of Nutritional Status of toddlers in the Working Area of Candi Health Center

With a percentage of 86%, almost all toddlers are included in the category of normal nutritional status groups that are on the Green Line in the KMS book. This can be seen from the data above, because the majority of parents who take their toddlers to the health center are mothers, and many of these mothers choose to stay at home and not do outside work. Housewives usually have plenty of time to monitor their child's development, from food intake and vaccination schedules to encouraging their growth.

Mothers are more likely to breastfeed their children exclusively for six months and feed them regularly and nutritionally based on their needs. In addition, parental education and information are essential for the child's development. With a proportion of 44%, the above data shows that parents of toddlers in the Senior high school category are most commonly found. The final level of education offered by parents is diploma education, which is in second place with a proportion of 21%. This shows that the majority of parents have a strong educational background and can help children grow and develop. Not only that, some parents of young children work in the private sector, as civilian workers, or as business owners, which means that economic issues can affect how

well and adequately children are fed.

2. Distribution of Family Smoking behavior of toddlers in the House

Smoking is a common habit among families with young children. According to data, up to 80% of families under five reported having an active Family Smoking in the home. Parents of toddlers call daily smokers their fathers, grandfathers, brothers and many neighbors. Children with breathing problems are sure to be around smokers, whether they are family members or other people.

This may be the result of families not being informed about the risks of smoking to children's health, as they are particularly vulnerable to the negative effects of secondhand smoke. The desire to smoke is often stronger than the desire to quit, even when parents are aware that smoking is bad for their children.

3. Distribution of pneumonia in toddlers in the area of the Candi Health Center

A total of 37 toddlers overall, or 86% of the total, had pneumonia. Then there were 6 toddlers or 14% of the total who came with complaints of fever, slimy cough, and shortness of breath but did not have pneumonia. Boys are more likely to get pneumonia than girls. This may be because the initial immune system of boys is slightly weaker than that of girls. According to certain studies, the male hormone testosterone can actually reduce the immunological response, while the female hormone estrogen supports the immune system. Boys are therefore more susceptible to respiratory diseases.

In addition, the airways of male babies are smaller than those of females. When men experience disease with more severe pneumonia symptoms, this can make them experience shortness of breath more quickly. In addition, men are more likely to be born prematurely than women. Premature birth is more common in boys than in girls. Babies born prematurely are very susceptible to pneumonia infection because their lungs are not yet fully developed. It may also be the result of unfavorable environmental conditions, such as exposure to smoke in cigarettes, unhealthy home environment, inadequate ventilation, and others.

4. Relationship of nutritional status of children under five with pneumonia incidence in children under five in the working area of Candi Health Center

Based on the findings as many as 37 toddlers (86%) with pneumonia or pneumonia who visited the Candi Health Center have normal nutritional conditions. There was no relationship between the occurrence of pneumonia in infants with their nutritional status according to the study data, with

a significance value (2-tailed) > 0.05 . The nutritional Status of toddlers can deteriorate due to the severity of their infections, and the immune system is negatively affected by malnutrition. Lack of protein energy is a cause that can affect the development of pneumonia in young children. Pneumonia is also caused by a compromised immune system of children, which makes the infection easier to fight. Instead of examining toddlers' overall consumption patterns, the study assessed their nutritional status based solely on their weight. The onset of pneumonia infection due to protein energy deficiency is not seen from the baby's weight status, so there is no relationship between the nutritional status of toddlers and the occurrence of pneumonia.

The findings of this study are in line with a study conducted in 2019 in Sutawangi village on the relationship between the nutritional health of toddlers and the prevalence of pneumonia in this age group. According to the study, there is no relationship between the nutritional health of newborns and the prevalence of pneumonia. It is evident from these findings that the state of nutrition of toddlers is not the main cause of pneumonia. This is due to the fact that most children with pneumonia are in good nutritional conditions (Subandi, 2020).

5. Relationship of family smoking behavior with the incidence of pneumonia in toddlers in the work area of Candi Health Center

From the above research data, there is a relationship between the prevalence of pneumonia in toddlers in the work area of the Candi Health Center and family smoking behavior. There are families actively smoking within the home, according to the majority of respondents. The Data showed that families who actively smoke must have a child with pneumonia.

Of the 43 respondents, the majority (80%) reported having an active family smoking at home, according to the results of the study. Continuous exposure to cigarette smoke causes health problems and reduces the strength of the body's immune system, so it is very risky for toddlers. Exposure to secondhand smoke increases the prevalence of respiratory infections in children and reduces the strength of their immune systems, making toddlers more sensitive to infections.

Continuous and regular exposure to cigarette smoke causes the body to absorb nicotine and other harmful substances, including more than 4000 chemical compounds, 250 of which are known to be extremely harmful. Children with weakened immune systems will ingest toxins in cigarette smoke if exposed. In addition, the child's immune system may decrease, making it more sensitive to

bacterial or viral infections that cause pneumonia.

The findings of this study show that there is a significant relationship between the incidence of childhood pneumonia and family smoking behavior, the significance value (2-tailed) of $0.000 < 0.05$. According to the results of the study, one of the risk factors for pneumonia in toddlers is the varied family smoking habits, which have an impact of 28.9% on the incidence of pneumonia in toddlers. Considering that there are 71.1% more causes that can cause pneumonia in toddlers, it can be said that the smoking characteristic of the family is not the only risk factor for the disease. The sex of the toddler, age, exclusive breastfeeding, immunization status of the toddler, and environmental factors such as air pollution or density of residence are risk factors for pneumonia, and family smoking behavior is just one of them.

The findings of this study are in line with Aufa research which confirms that exposure to cigarette smoke increases the incidence of pneumonia by 11.7% has a p value=0.000 and a 95% confidence level (CL) of 4,063 - 33,694 (Khairunnisa, 2024). This is in line with the findings of the Luthfiyuni 2021 study, which showed a strong relationship between the incidence of pneumonia in toddlers and family smoking behavior. According to the findings of Luthfiyani's analysis, children exposed to their parents' tobacco smoke are 18.4 times more likely to be infected with pneumonia than unexposed toddlers (Eka, 2021).

Male toddlers are 2,068 times more likely to contract pneumonia than female toddlers, according to the findings of the 2016 pneumonia risk factors study conducted in Benowo, Surabaya. The reason for this is that the airways of boys have a smaller diameter than those of girls. The slower development of male body cells compared to women suggests that men are more prone to pneumonia. And also according to the study, toddlers who are not exclusively breastfed have a 2,425-fold higher risk of pneumonia compared to those who are exclusively breastfed (Maya, 2016).

According to a study conducted in Bandar Lampung in 2020, incomplete immunization status of toddlers is 7.8 times more likely to be infected with pneumonia than toddlers with complete immunization status. One strategy to increase a child's immunity or physical resistance to a disease is immunization. Children will be susceptible to infectious diseases such as pneumonia if they have not been vaccinated against measles. And also according to the literature, infection with pneumonia in children is also associated with low birth weight. This is because compared to children who are born healthy, newborns with low birth weight are more sensitive to pneumonia infection because their immune system is still lacking.

Conclusion

Based on the research that has been done in the health center of the Temple about the relationship between the nutritional status of children under five and family smoking behavior with the incidence of pneumonia in children under five can be concluded that:

1. Most of the nutritional status of toddlers in the work area of Candi Sidoarjo Health Center is in the green or normal line category.
2. Most toddlers with pneumonia have a family member who smokes in the House.
3. Most of the toddlers who came to the Candi Health Center were declared to have pneumonia
4. There is no relationship between the nutritional status of children under five with the incidence of pneumonia in children under five in the working area of the Candi Health Center
5. There is a relationship between family smoking behavior and the incidence of pneumonia in toddlers in the work area of the Candi Health Center.

Suggestion

1. For Health Workers

It is better for medical professionals to conduct a more comprehensive examination and offer appropriate treatment if respiratory diseases such as pneumonia are found. In addition, parents and families should be made aware of the risks of smoking for themselves and others, especially if they have small children living at home. To prevent germs or viruses from causing pneumonia, health professionals also emphasize the value of immunization in children and the need to lead a clean and healthy lifestyle.

2. For mothers who have toddlers

It is hoped that mothers or families with young children will be more aware of the importance of children's health. Parents should provide toddlers with a nutritionally balanced diet to monitor their nutritional intake. As far as possible, keep children away from smokers. To prevent children from being exposed to excessive cigarette smoke, it is recommended that family members who smoke stop smoking or always carry out the habit of always living clean and healthy in the House. Parents should also change clothes and wash their hands before interacting with children because cigarette smoke will remain on clothes for a while. Then the parents can routinely discuss the

child's health with medical professionals.

3. For further researchers

The risk factors that influence pneumonia in toddlers and their influence on the growth and development of children can be investigated further. Furthermore, research can be done to make intervention plans can improve the Prevention of pneumonia in children.

References

- Antonio, M., Vicasco, N., & Handayani, D. (2020). Literature review: analysis of Risk Factors for Pneumonia in toddlers.
- Aprilia, R., & Faisal, F. (2024). Literature review: Risk Factors and Epidemiology of Pneumonia <http://journal.scientic.id/index.php/sciena/issue/view/19>
- Sidoarjo District Health Office. (2022). Sidoarjo Regency Health Profile 2022.
- Sidoarjo District Health Office. (2023). Sidoarjo Regency Health Profile 2023.
- Faizah, A. (2024). Skipsi Pneumonia Risk Factors in toddlers at Ujung Pandang Baru Health Center and Ballaparang Health Center Makassar City.
- Ministry Of Health Of Indonesia. (2023a). Decree Of The Minister Of The Republic Of Indonesia National Guidelines For Health Services Pneumonia Procedures.
- Ministry Of Health Of Indonesia. (2023b). Indonesian Health Profile 2023.
- Khairunnisa, A. (2024). Contact Us As Soon As Possible With Pneumonia In Children Aged 1-4 Years.
- Subandi, E. (2020). The relationship between the nutritional Status of toddlers and the cause of Pneumonia in toddlers in Sutawangi Village, working area of UPTD Peskesmas DTP Jatiwangi in 2019. *Journal Of Syntax Admiration*, 1 (2).
- Sumarni, S., & Rashidah. (2023). Family characteristics of toddlers and nutritional Status of toddlers with Pneumonia in the Health Center Moncek Sumenep. In *The Indonesian Academic Journal Of Health Sciences* (Vol. 2, Number 1).
- Revelation, W. (2022). Relationship Of Parental Smoking Risk To The Cause Of Pneumonia In Children Under Five.
- World Health Organization. (2022). Revision of the WHO classification and treatment of childhood pneumonia in health facilities.