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The Relationship Between Parental Smoking Habits and the Incidence of ARI in Toddlers at the Integrated Health Post (Posyandu) in Bani Amas Village, Bengkayang

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ABSTRACT

Acute Respiratory Tract Infection (ARI) is a disease of the upper or lower respiratory tract. This disease is contagious and causes a range of signs and symptoms, from asymptomatic and mild infections to more severe and potentially fatal illnesses, depending on the pathogen. The presence of family members who smoke in the home is a contributing factor to health problems within the family, such as respiratory disorders. Moreover, it may increase the incidence of ARI, especially in toddlers. The study determined the relationship between parental smoking habits and the incidence of ARI in the Integrated Health Post (Posyandu) of Bani Amas Village, Bengkayang. Using a quantitative method with a cross-sectional approach, with a sample of 54 respondents, data were collected by distributing questionnaires and analyzed using the Spearman Rank test. The study showed no relationship between parental smoking habits and the incidence of ARI in toddlers at the Integrated Health Post (Posyandu) of Bani Amas Village, Bengkayang, where the result was a p-value of 0.054 (>0.05). The results of this study indicate that smoking habits are not the only factor that influences the incidence of ARI in toddlers. Still, cigarettes only provide vulnerability to ARI in toddlers because they contain harmful substances that can damage the respiratory system during the developmental stage.

Keywords: Acute Respiratory Tract Infection, Smoking Habits, Toddlers

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1. Introduction

Acute Respiratory Tract Infection (ARI) is a disease of the upper or lower respiratory tract. This disease is contagious and causes a range of signs and symptoms, from asymptomatic and mild infections to more severe and potentially fatal illnesses, depending on the pathogen (Rusady et al., (2022).

The World Health Organization (WHO, 2020) reported that ARI is a leading cause of morbidity and mortality from infectious diseases worldwide. Approximately 4 million infants die each year from acute respiratory infections, with 98% of these deaths caused by pneumonia, bronchitis, and bronchiolitis. The mortality rate is very high in infants under 5 years of age, especially in low- and middle-income countries. An estimated 1,988 cases of ARI were reported in toddlers aged 1-5 years, with a prevalence of 42.91%. Acute respiratory infection is one of the most frequently consulted diseases in health care facilities, particularly in pediatric care.

The prevalence of ARI in Indonesia, according to the Indonesian Health Profile (2020), the ten provinces with the highest ARI cases are Jakarta (46.0%), Banten (45.7%), West Papua (44.3%), East Java (742.9%), Central Java (39.8%), Lampung (37.2%), Central Sulawesi (35.8%), NTB (34.6%), Bali (31.2%), and West Java (28.1%). The incidence of ARI in toddlers in Indonesia reaches 3-6 times per 3 years, and 10-20% is pneumonia (Himawati & Fitria, 2020). In Indonesia, ARI is the leading cause of death in infants and morbidity in toddlers. In addition, this disease is often among the 10 most common diseases in health facilities, especially in community health centers (Febrianti, 2020).

According to data reported by the West Kalimantan Provincial Health Office, in 2023, West Kalimantan ranked 20th in terms of ARI cases, with a prevalence of 3.2%. It becomes a crucial concern about the distribution of ARI cases by age, across regencies and cities in West Kalimantan. Toddlers account for the second-highest number of ARI cases in West Kalimantan, approximately 1,238 of the 4,264 cases, or 29 percent.

ARI, in Pontianak City, West Kalimantan Province, is a disease that consistently increases annually. According to the summary of ARI control reports from the City Health Office, the number of visits to ARI cases in toddlers categorized as cough-related ARI, not pneumonia, in 2020 was recorded at 5.513 from 23 community health centers (Pontianak City Health Office, 2020). Meanwhile, according to the Health Office (2015), there were 625 cases of ARI in Bengkayang Regency. Furthermore, Basic Health Research (Riskesdas), in its 2018 report, found that the prevalence of ARI in Bengkayang Regency is 15.29% or 1,423 people (Riskesdas 2018).

ARI in toddlers is caused by several factors, including the home environment and internal factors of the toddler, such as nutritional status, exclusive breastfeeding, complete immunizations, low birth weight, and infant age. Also, factors of indoor air quality can trigger ARI, including Environmental Tobacco Smoke (ETS), or exposure to cigarette

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smoke in the home (Zahra & Assetya, 2018). Exposure to cigarette smoke in the home is a major factor in indoor air pollution, causing respiratory problems, particularly in vulnerable groups, like toddlers (Zahra & Assetya, 2018).

Family members who smoke in the home are a contributing factor to health problems within the family, such as respiratory problems, and an increased risk of ARI, especially in toddlers. Children whose parents smoke inside the home are more susceptible to respiratory diseases (Wardani et al., 2021). The toxic substances contained in cigarettes can trigger lung cancer, which makes the smoke of cigarettes fatal for respiratory health, especially for toddlers (Zahra & Assetya, 2018).

According to Jamal et al. (2022), the smoke of cigarettes in the home is the family environmental factor most likely to cause ARI in children. Analysis of ARI in each region is urgent to determine the distribution of incidence, pathogenic factors, and the strength of the relationship between exposure and outcome on a smaller scale. This information provides more precise strategic guidance for ARI control. Parental smoking habits in the home expose toddlers to passive smokers, who are constantly exposed to cigarette smoke. Wahyudi et al. (2021) stated homes where parents smoke has a 7.83-fold increased risk of ARI compared to homes where parents do not smoke (Juniantri, 2023).

Several studies concluded a significant relationship between smoking behavior and ARI incidence in toddlers. Studies by Aprilla et al. (2019) and Wahyuni et al. (2020) found a relationship between parental smoking behavior and ARI incidence in toddlers. It was followed by Wahyudi et al. (2021), which demonstrated a relationship between cigarette smoke exposure and ARI incidence in toddlers. However, this study indicates a research gap, stating that there is no relationship between smoking behavior and the incidence of ARI in toddlers, specifically the study by Wahyuningsih et al. (2017). The study follows with Gobel et al. (2021) that there is no relationship between smoking and the incidence of ARI in toddlers.

Based on the background and high number of ARI, early prevention is necessary. Therefore, the researchers tried to conduct research on ARI and presented their findings in a study entitled "The Relationship Between Smoking Habits and the Incidence of ARI in Toddlers, Aged 1-5 Years, at the Integrated Health Post (Posyandu) in Bani Amas Village, Bengkayang Community Health Center Area."

2. Research Method

The study used an observational analytical study with a cross-sectional approach. The study examined the relationship between variables, both the independent variable of smoking habits and the dependent variable of the incidence of acute respiratory infections (ARI). The population was all parents of toddlers aged 1-5 years, totaling 54 respondents (toddlers) at the Integrated Health Post (Posyandu) in Sentagi Hamlet and Kampung Pisang Hamlet, Bani Amas Village, within the Bengkayang Community Health Center area, for

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the last 1 year. It used total sampling. The measuring instrument was a questionnaire, consisting of 16 statements about the incidence of Acute Respiratory Infections (Caniago et al., 2022) and a questionnaire about smoking habits (Shelemo, 2023). This study has passed the ethical review with number 50/II.I.AU/KET.ETIK/VI/2025. The data analysis test used Spearman's rank correlation. The correlation test aimed to determine the relationship between variables.

3. Result and Discussion

a) Respondent Characteristics

Respondent characteristics were collected to determine the characteristics of the head of the household, serving as an introductory step before conducting the research. Respondent's characteristics were determined by approaching the heads of families and toddlers, as follows:

Table 1
Frequency Distribution Based on Age, Education, and Occupation of Respondents in the Integrated Health Post (Posyandu) at the Bani Amas Village in the Bengkayang Community Health Center Area, June 2025 (n: 54)

Respondent Characteristics	Frequency	Percentage **(%)**
Age		
17-25 Year (Late Adolescence)	15	27.8
26-35 Year (Early Adulthood)	33	61.1
36-45 Year (Late Adulthood)	6	11.1
Education		
SD (Elementary School)	9	16.7
SMP (Junior High School)	10	18.5
SMA (Senior High School)	31	57.4
University	4	7.4
Occupation		
Laborer	20	37,0
Farmer	32	96,3
Other	2	3.7
Total	**54**	**100.0**

Source: Primary Data (2025)

Table 1 shows that of the 54 respondents studied, based on the age of the toddler's parents, the majority were 23-35 years old (early adulthood), of 33 respondents (61.1%). Based on their parents' highest education, the majority had a high school education (31 respondents) (57.4%). Meanwhile, the majority of parents' occupations were farmers, 32 respondents (96.3%).

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b) Overview of Smoking Habits

Table 2
Frequency of Smoking Habits at the Integrated Health Post (Posyandu) of Bani Amas Village in the Bengkayang Community Health Center Area, June 2025 (n: 54)

Smoking Habits	Frequency	Percentage (%)
Non-Smokers	4	7.4
1-10 Cigarettes (light)	35	64.8
11-24 Cigarettes (moderate)	14	25.9
>24 Cigarette (heavy)	1	1.9
Total	**54**	**100.0**

Source: Primary Data (2025)

Table 2 shows that 4 non-smokers (7.4%), 35 light smokers (64.8%), 14 moderate smokers (25.9%), and 1 heavy smoker (1.9%).

c) Overview of ARI Incidence

Table 3
Frequency of Smoking Habits at the Integrated Health Post (Posyandu) of Bani Amas Village in the Bengkayang Community Health Center Area, June 2025 (n: 54)

ARI Incidence	Frequency	Percentage (%)
Mild of ARI	31	57.4
Moderate of ARI	21	38.9
Heavy of ARI	2	3.7
Total	54	100.0

Source: Primary Data (2025)

Table 3 shows that the number of children with mild ARI was 31 (57.4%), the number of children with moderate ARI was 21 (38.9%), and the number of children with heavy ARI was 2 (3.7%).

d) Overview of the Relationship between Smoking Habits and the Incidence of Acute Respiratory Infections

The results of the bivariate were tested using the Spearman rank test - a type of comparative test conducted on two variables. With a 95% confidence level (α=0.05), a p-value <0.05 indicates a significant relationship between the independent and dependent variables.

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Table 4
Relationship between Smoking Habits and the Incidence of ARI in Toddlers Aged 1-5 Years at the Integrated Health Post (Posyandu) of Bani Amas Village in the Bengkayang Community Health Center Area, June 2025 (n: 54)

Habit of Smoking	Incidence of ARI			Toddlers	
	Mild ARI	Moderate ARI	Heavy ARI	Total	*p-value*
	Count %	Count %	Count %	Count	
Non-Smoking	4 7,4%	0 0.0%	0 0.0%	4 7,4%	
1-10 Cigarettes	20 37,0%	15 27,8%	0 0.0%	35 64,8%	0.054
11-24 Cigarettes	7 13,0%	6 11,1%	1 1,8%	14 25,9%	
>24 Cigarettes	0 0.0%	0 0.0%	1 1,9%	1 1,9 %	
Total	**31** **57.4%**	**21** **38.9%**	**2** **3.7%**	**54** **100.0%**	

Source: Primary Data (2025)

Family members with a majority smoking habit of 1-10 cigarettes, with a mild ARI incidence of 20 people (37.0%). The Spearman rank test is p=0.054 (p-value > 0.05). Thus, there is no relationship between parental smoking habits and the incidence of ARI in toddlers at the Integrated Health Post (Posyandu) in Bani Amas Village, Bengkayang, in 2025. Ha is rejected, and Ho is accepted.

e) Discussion

Based on the research, the majority of family members smoked 1-10 cigarettes, with 20 people (51.1%) experiencing mild ARI. Spearman's rank analysis aims to determine the relationship between smoking habits and ARI incidence in toddlers. Based on the statistical test results, the p-value was 0.054. It concludes that there was no relationship between smoking habits and the incidence of respiratory tract infections in toddlers at the Integrated Health Service Post (Posyandu) in the Bengkayang Community Health Center (Puskesmas) in 2025.

These results support the research conducted by (Irianto et al., 2021). The statistical test showed a p-value of 0.240 > 0.05. Thus, Ha is rejected. The requirement for Ha is a p-value <0.05, which indicates no relationship between smoking habits among family members and ARI incidence in children aged 1-5 years in the Talang Padang Community Health Center area.

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Also, the study follows a study by (Guntari et al., 2021) , entitled "An Analysis of the Relationship Between Home Physiological Factors and Smoking Habits and the Incidence of ARI in Toddlers in the Badran Jetis Area of Yogyakarta City," with a p-value of 0.118 > 0.05. The result indicates no association between smoking habits and the incidence of ARI in toddlers in the Badran area.

However, this study disagrees with a study by (Kumar & Rahagia, 2024) entitled "Factors Associated with the Incidence of ARI in Toddlers." The study found a relationship between smoking and the incidence of ARI in toddlers. The findings are that 73% of parents smoked. Then, there was a significant relationship with ARI based on an OR of 4.364 ($p<0.05$).

According to the Indonesian Ministry of Health (2018), cigarette smoke from parents or other household members who share a roof with toddlers is a serious indoor pollutant. Moreover, it increases the risk of illness from toxic substances in children. Continuous exposure can cause respiratory problems and lead to acute respiratory infections and lung disorders in adulthood. The more cigarettes a family smokes, the greater the risk of acute respiratory infections (ARI).

The smoking habits of respondents are often influenced by a lack of awareness of their children's health, which leads them to smoke freely both inside and outside the home. Moreover, they ignore the dangers of smoking to others. Smoking habits at the health post (*Posyandu*) in Bani Amas village are very high; smoke 10 cigarettes a day as light smokers, smoke 11-24 cigarettes as moderate smokers, and others smoke more than 24 cigarettes daily as heavy smokers.

Also, smoking habits in Bani Amas village are closely related to a person's occupation. In this study, the majority of household heads who smoked were farmers and self-employed. This indicates that farmers and laborers often have easy access to cigarettes. Due to the heavy workload, they often smoke a lot of cigarettes to feel focused and reduce stress. After that, it leads to a stronger desire to smoke, which eventually becomes a habit.

Overall, these results indicate that smoking is not the sole factor influencing the incidence of ARI in toddlers. Rather, smoking increases their vulnerability to ARI as cigarette smoke contains harmful substances that can damage the respiratory system. When the respiratory defenses are compromised, viruses and bacteria more easily enter and multiply in the toddler's respiratory tract. However, smoking in the home is not the only factor influencing the incidence of ARI in toddlers. Other factors such as home air quality, ventilation, environmental sanitation, the child's nutritional status, and access to healthcare also contribute significantly to the incidence of ARI. Also, it depends on the condition of the toddler and the smoker.

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4. Conclusion

The characteristics of the respondents (parents of toddlers) and the toddlers were selected based on the age of the toddlers' parents. The majority of respondents were between 23 and 35 years old (early adulthood), comprising 33 people (61.1%). Meanwhile, based on the educational background, the majority of parents' education was high school, with 31 people (57.4%). In the occupation, the majority of parents were farmers, 32 people (96.3%). However, in this study, the majority of toddlers who suffered from ARI aged 1 year were 22 (40.7%), and female by gender, 29 toddlers (53.7%).

Based on the smoking habits of family members, the number of non-smokers was 4 people (7.4%), the number of light smokers was 35 people (64.8%), 14 people for moderate smokers (25.9%), and 1 person for heavy smokers (1.9%).

The incidence of ARI in toddlers aged 1-5 years was found, with 31 children (57.4%) suffering from mild ARI, 21 children (38.9%) suffering from moderate ARI, and 2 children (3.7%) suffering from heavy ARI.

The Spearman Rank test obtained a p-value of 0.054 (p-value > 0.05). Thus, there is no relationship between smoking habits and the incidence of ARI in toddlers aged 1-5 years at the Integrated Health Post (*Posyandu*) Bani Amas Village in the Bengkayang Community Health Center (*Puskesmas*) in 2025. Ha is rejected, and Ho is accepted.

Furthermore, the results indicate that smoking is not the only factor influencing the incidence of ARI in toddlers. But it only increases susceptibility to ARI in toddlers because cigarette smoke contains harmful substances that can damage the respiratory system of toddlers.

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