

The relationship between physical sanitation of the house and the incidence of ARI in children under five in the working area of the Naioni Public Health Center in 2021

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Abstract

Acute Respiratory Infection (ARI) is a disease that infects the upper respiratory tract and lower respiratory tract. One of the risk factors for ARI disease is the physical sanitation of the house. The physical sanitation components of the house are the ventilation of the house, the ownership of the smoke hole, the density of the room occupancy, the type of floor and the type of wall. The purpose of this study was to determine the relationship between physical sanitation of the house and the incidence of ARI among children under five in the working area of the Naioni Health Center. The type of research used is analytic with a cross sectional research design. The population in this study were all children under five who were in the working area of the Naioni Health Center which amounted to 1,142 toddlers. The Collection data used interview, observation and measurement techniques for 92 toddlers using proportional random sampling technique. Bivariate analysis using Chi-Square statistical test. The results showed that the variables related to the incidence of ARI were *house ventilation* ($p \text{ value} = 0.000 \leq 0,05$), *smoke hole ownership* ($p \text{ value} = 0.000 \leq 0,05$), *room occupancy density* ($p \text{ value} = 0.003 \leq 0,05$), *type of floor* ($p \text{ value} = 0.004 \leq 0,05$) and *the type of wall* ($p \text{ value} = 0.019 \leq 0,05$). The Naioni Health Center is expecting to continue to make prevention efforts and counseling about healthy homes to the entire community.

Keywords: Acute respiratory infection (ARI), physical sanitation of the house

I. Introduction

Acute Respiratory Infection (ARI) is an infectious disease that can attack the upper respiratory system to the lower respiratory tract which has an incubation period of 14 days. Acute Respiratory Infections are usually more common in infants and children. Symptoms of ARI disease occur quickly in just a few days. Symptoms include dry cough or phlegm, runny nose, fever, sore throat, shortness of breath and if left unchecked will result in death.

Acute respiratory infection is also an environment-based disease where the role of the environment is very influential in the occurrence of ARI, one of which is home sanitation. Physical home sanitation is an effort to maintain the physical condition of the house so as not to cause or cause a health problem.

Based on World Health Statistics Data released by the World Health Organization WHO in 2018 recorded 20.1% of under-five deaths in the world due to ARI. In the city of New York as the capital of developed countries, the number of ARI sufferers is very high. Compared to developing countries, it is 30-70 times higher than developed countries, it is estimated that 20% of babies born in developing countries barely reach the age of 5 years and 26-30% of child deaths are caused by ARI.

Acute respiratory infections are a very serious health problem in Indonesia. Based on the results of basic health research, Riskesdas, the prevalence of Acute Respiratory Tract Infection (ARI) in children in Indonesia is 7.5% and ARI are the ten types of diseases with the highest cases. Cases of ARI in 2019 in Indonesia amounted to 52.9% with the province with the highest prevalence of Pneumonia in children under five is NTB Province (6.38%) followed by Bangka Belitung Islands Province (6.05%), South Kalimantan (5.53%) and the province of East Nusa Tenggara (4.28%) which is in 11th place with 6.620 cases of ARI in toddlers and 22 cases of death in toddlers caused by pneumonia. NTT is still high and is a serious problem. NTT itself has cases of ARI in children under five in every district/city. Kupang district with the highest ARI cases in children under five with the number of cases was 756 cases, West Sumba 288 cases, Manggarai 262 cases and Kupang City was also the highest contributor to ARI cases with the number of cases in 2018 amounting to 189 ARI cases in toddlers.

A study conducted in the village of Niukbaun Amarasi Tengah, Kupang district, showed that there was a relationship between the condition of the floor of the house, the temperature and humidity of the house, the density of the house, and the area of house ventilation with the incidence of ARI in children under five. poor nutrition, incomplete immunization, overcrowding and physical home environment. Household smoke that still uses firewood is also a risk factor for the occurrence of acute respiratory infections (ARI).

II. Methods

The type of research used is analytical research with a cross sectional research study design. This research was conducted from September to October 2021. The location of the research was in the working area of the Naioni Public Health Center. Collecting data directly at the respondent's residence by complying with the health protocol. The population in this study were all children under five in the working area of the Naioni Public Health Center with a population of 1,142 children under five. The sample size was determined using the Slovin formula with the sample size being 92 Toddlers.¹²

Instruments in the study of physical sanitation of homes with the incidence of ARI are questionnaires and measurement sheets. The incidence of ARI is sick and not sick, while the physical sanitation of the house is determined by observation and measurement sheets. Measurements taken are the ventilation area is more than or equal to 10% of the floor area and also the measurement of the room area of 8 meters² is only occupied by 2 people and for observations, namely the ownership of the smoke hole, type of floor and type of wall.¹³

The research has been approved and has obtained ethical approval from the Health Research Ethics Committee, FKM Undana with number 2021143 – KEPK and has received approval from the ethics committee team to meet respondents directly by complying with health protocols, so that interviews and measurements of ventilation and ventilation area are obtained. Room area is done by implementing health protocols.

III. Results

3.1 Table 1 Analysis of the relationship between home ventilation and ARI disease in toddlers

Ventilation	ARI		Total		p-value
	No ARI	Yes	n	%	
Not Eligible	23	48	71	77,2	0,000
Qualify	6	15	21	22,8	
Total	29	63	92	100	

The data obtained were analyzed with variables using the Chi square statistical test. The results of the analysis can be seen in table 1 which shows there is a relationship between home ventilation and the incidence of ARI in children under five.

Home ventilation that does not meet the requirements has a relationship with high cases of acute respiratory tract infections in toddlers so that there are 48 toddlers who experience ARI in the working area of the Naioni Health Center. The results of statistical analysis using the chi square test showed that proper ventilation of the house reduced the incidence of ARI in children under five. This means that home ventilation is one of the factors causing the transmission of acute respiratory infections so that proper ventilation can reduce the incidence of acute respiratory infections.

III.2 Table 2 Analysis of the relationship between smoke hole ownership and ARI disease in toddlers

Original hole awnership	ARI		total		p-value
	No	Yes	n	%	
Do not have	24	46	70	76,1	0,000
Own	5	17	22	23,9	
Total	29	63	92	100	

The data obtained were analyzed with variables using the Chi square statistical test. The results of the analysis can be seen in table 2 which shows the relationship between ownership of a kitchen smoke hole and the incidence of ARI in children under five.

Owning a smoke hole in the house can minimize the occurrence of smoke pollution in the house because the smoke will come out through the hole that has been provided. Respondents who do not have smoke holes in the kitchen have a high chance of contracting acute respiratory infections, so that 46 children under five who experience ARI in the working area of the National Health Center have a high chance of contracting acute respiratory infections. The results of statistical analysis with the chi square test showed that respondents who had smoke holes could reduce the incidence of ARI in children under five. This means that the ownership of smoke holes is one of the factors causing the transmission of acute respiratory infections.

III.3 Table 3 Analysis of the relationship between room occupancy density and ARI disease in toddlers

Occupancy Density	ARI		total		p-value
	No	Yes	n	%	
Not Eligible	18	33	51	55,4	0,003
Qualify	11	30	41	44,6	
Total	29	63	92	100	

The data obtained were analyzed with variables using the Chi square statistical test. The results of the analysis can be seen in table 3 which shows the relationship between residential density and the incidence of ARI in children under five. Density of occupancy in the house is one of the factors of disease transmission, especially respiratory diseases that are transmitted through the air or breathing. This means that residential density needs to be considered so that the transmission of disease in the house can be reduced. The results of the study found that the density of occupancy that did not meet the requirements was 51 respondents so that those who experienced ARI were 33 of the respondents whose occupancy density did not meet the requirements. The results of statistical analysis with the chi square test showed that the density of housing that meets the requirements can reduce the incidence of ARI in children under five. This means that residential density is one of the factors causing the transmission of acute respiratory infections.

III.4 Table 4 Analysis of the relationship between the type of floor of the house with ARI disease in Toddlers

Floor type	ARI		total		p-value
	No	Yes	n	%	
Not Eligible	13	28	41	44,6	0,004
Qualify	16	35	51	55,4	
Total	29	63	92	100	

The data obtained were analyzed with variables using the Chi square statistical test. The results of the analysis can be seen in table 4 which shows the relationship between the type of floor and the incidence of ARI in children under five. The type of floor of the house can be a medium for disease transmission if it does not meet health requirements. The results showed that the type of floor of the house that did not meet the requirements could experience acute respiratory infection. The results of statistical analysis using the chi square test showed that the type of floor that meets the requirements can reduce the incidence of ARI in children under five. This means that the type of floor of the house is one of the factors causing the transmission of acute respiratory infections so that the type of floor that meets the requirements can reduce the incidence of acute respiratory infections.

III. 5 Table 5 Analysis of the relationship between types of house walls and ARI disease in toddlers

Wall type	ARI		total		p-value
	No	Yes	n	%	
Not Eligible	8	20	28	30,4	0,019
Qualify	21	43	64	69,6	
Total	29	63	92	100	

The data obtained were analyzed with variables using the Chi square statistical test. The results of the analysis can be seen in table 5 which shows the relationship between the type of wall and the incidence of ARI in children under five.

The results of the study found that most of the respondents' houses did not meet the requirements so that 28 toddlers experienced ARI. The results of statistical analysis using the chi square test showed that the type of house walls that met the requirements reduced the incidence of ARI in children under five. This means that the type of house wall is one of the factors causing the transmission of acute respiratory infections.

IV. Discussion

Based on the results of research from 92 respondents conducted in the working area of the Naioni Public Health Center, it was found that most of the respondents' houses had poor ventilation or did not meet health requirements, this was also seen directly when the researchers went to the respondent's house, where ventilation

holes were found to be less than 10%. from the floor area, even in the respondent's house there are those who do not have home ventilation or only expect the windows of the house and do not even have a cover so that air from outside directly enters the house. respondents often do not open the window. Pathogenic bacteria that cause ARI and also dirty air such as dust can be freed from room air flowing out through qualified ventilation. The humidity in the air in the room rises causing bacteria to grow properly, but with adequate ventilation this will not happen because good ventilation keeps the humidity in the room optimal. Discharge of dirty air from a closed room naturally or mechanically must comply with health standards. The availability of fresh/clean air in a house or room is very much needed by humans, so that if a room does not have a good ventilation system, it can cause conditions that can be detrimental to humans, especially health problems.

The results of the analysis show that there is a relationship between home ventilation and acute respiratory infection in children under five. Acute respiratory infection is one of the infectious diseases that spreads very quickly, either directly or indirectly. toddlers are hosts who are very susceptible to ARI disease, this is because toddlers have low immune systems.

The relationship between smoke hole ownership and the incidence of ARI in children under five

The results of research conducted by researchers in the working area of the Naioni Public Health Center found that the houses of respondents who carried out traditional burning generally did not have a hole where smoke came out so that smoke could enter the room and could cause health problems, especially respiratory tract infections. Respiratory tract infections are not only caused by viruses and bacteria but also caused by particles of dust and smoke that enter the human respiratory system so that the respiratory system becomes infected. The hole where the smoke escapes in the kitchen is very important because smoke has an effect on the health of toddlers and children. also humans or for residents in the house. A kitchen that does not have a smoke hole will cause pollution into the house, on the other hand if the kitchen is equipped with a smoke hole then pollution into the house can be minimized. Smoke from combustion in high concentrations can cause damage to the lung defense mechanisms so that it will facilitate the emergence of ARI in toddlers.

The results of the analysis showed that there was a significant relationship between smoke holes and ARI in children under five. The results of this study are different from the results of research conducted by Dewi in 2012 with the title Relation of Physical Environmental Conditions of the House with the Incidence of ARI in Toddlers in the Work Area of the Gayamsari Health Center Semarang City, where in the study it was concluded that there was no relationship between smoke holes and the incidence of ARI in toddlers. This happens because the majority of the population in the research location has smoke and ventilation holes in the kitchen.

The results of research conducted in the working area of the Naioni Health Center found that the density of occupancy in the house did not meet the requirements, this was because the number of people in the house did

not match the area of the room, even in one house there were two heads of families occupying one house. This can lead to very rapid disease transmission, especially infectious diseases that are transmitted through the air. The density of occupancy in the house according to the Decree of the Minister of the Republic of Indonesia No. 829/Menkes/SK/VII/1999 regarding the requirements for a healthy house is a maximum of 2 people per 8 m². The criteria that meet these health requirements can be useful for preventing disease transmission and can facilitate activities of daily life. However, most of them in the working area of the Naioni Puskesmas do not comply with the requirements for a healthy home. The level of residential density that does not meet the requirements is due to the area of the house that is not proportional to the number of families who occupy the house. The area of a narrow house with a large number of family members can cause the ratio of occupants to the area of the house to be unbalanced. This residential density allows bacteria and viruses to be transmitted through breathing from one householder to another, even to minors.

Based on the results of research that has been analyzed, it is found that there is a relationship between room occupancy density and ARI in toddlers. These results are in accordance with research conducted by Yunita Ringgih Pengstika on toddlers in palm sugar-making families in Pandanarum Village and Beji Village, Pandanarum District, Banjarnegara Regency which showed that there was a relationship between the area of room occupancy density and the incidence of ARI among toddlers in palm sugar-making families in Pandanarum Village and Beji Village, Pandanarum District, Banjarnegara Regency with p value = 0.000 (p value < 0.05).

The results of research conducted by researchers in the working area of the Naioni Health Center found that respondents' houses with mostly semi-permanent floors and some are made of soil so that during the dry season it can cause ash and during the rainy season humidity occurs which can cause bacteria and other pathogens to grow. last long in the house. The floor of the house that meets the requirements is made of cement or ceramics, while the floor that does not meet the requirements is made of earth. Good floor conditions can reduce water intrusion so that it can reduce humidity in the house. The floor of the house that is always wet or dry makes it easy for bacteria to arise from the damp floor or ash from the floor from the ground, causing ARI in people who are in the house, especially toddlers.

Based on the results of research conducted by researchers in the working area of the Naioni Public Health Center, it was found that there was a relationship between the type of floor of the house and ARI in toddlers. The results of this study contrast with research conducted by Safitri and Keman in 2021 with the title Relationship of Home Health Levels with ARI occurrence in Toddler Children in Labuhan Village, Labuhan Badas District, Sumbawa Regency, where in this study the results obtained: there is no relationship between the floor of the house with the incidence of ARI in toddlers.

Based on the results of research conducted by researchers in the working area of the Naioni Public Health Center, it was found that the types of walls of residents' houses varied, some were permanent, semi-permanent and some were not permanent, such as those made of wood, bamboo and bebak tuak. Most of the respondents' places where the walls were semi-permanent or better known as half walls. This can cause air from outside the house to enter easily such as dust which can cause respiratory tract infections, especially in toddlers who have low immune systems.²³ The condition of the walls of the house that does not meet the requirements is due to low socioeconomic status. The walls of houses made of woven bamboo or plywood or wood are generally very dusty which can be a medium for viruses or bacteria and dust to be inhaled by the occupants of the house carried by the wind. One of the requirements in terms of the strength of the walls of the house is to use materials that can be guaranteed to be durable and easy to maintain, and to use fire-resistant materials for parts that are not easily flammable, and are strong from the influence of external conditions such as wind, rain, earthquakes, and others.

The results of the analysis showed that there was a relationship between the walls of the house and ARI in children under five in the working area of the Naioni Public Health Center. This type of wall is in line with previous research conducted by Afandi entitled *The Relationship of the Physical Environment of the House with the Incidence of Acute Respiratory Infections in Toddlers at Sungailiat Health Center, Bangka Regency in 2020*. This study found that there was a significant relationship between the walls of the house and the incidence of ARI in Toddlers in Trimajo, West Java, with a P. Value of $0.017 < 0.05$.

V. Conclusion

People who have physical sanitation at home that do not meet health standards tend to experience acute respiratory infections, especially in children under five who are susceptible to various kinds of diseases because toddlers have a weak immune system. The results of statistical tests also show that there is a relationship between physical sanitation of the house and the incidence of ARI in children under five. Therefore, the National Public Health Center is expected to be able to carry out prevention efforts by conducting outreach to all communities in the National Health Center's working area.

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Attachment



Figure 1. interview and house floor measurement



Figure 2. ventilation monitoring and measurement