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Relationship Between Cleanliness of the Home Environment with Incidence of Acute Respiratory Infections among Children Under Five Years

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Abstract. Acute Respiratory Infections (ARI) was the first cause of illness among children under five years. One of the factors that because ARI was the cleanliness of the home environment. The study aimed at the relationship between the cleanliness of the home environment and the incidence of Acute Respiratory Infections (ARI) among children under five years. The cross-sectional study design approach was applied in this study. Sixty-six samples were recruited by using the simple random sampling technique. The research instrument used a healthy home assessment form and a medical record of Acute Respiratory Infections (ARI) disease. Data analysis was using the Rho Spearman Test. The results of this study showed that most are classified as healthy houses, as many as 36 respondents (55%), and those who did not experience Acute Respiratory Infections (ARI) was 35 respondents (53.0%). The Spearman Rho test results showed that the value = 0,000 or <α (0,005) meant that there was a correlation between the cleanliness of the home environment and the incidence of ARI in children under five in the Pungging Health Center Pungging District, Mojokerto Regency. If the house were not healthy, the toddler would get sick more easily because an unhealthy house would store a lot of dust. It could trigger Acute Respiratory Infections (ARI), and vice versa, if the home were healthy, then the occupants would also feel comfortable and not susceptible to disease.

Keywords: home environment cleanliness, Incidence Of acute respiratory infections, toddlers

INTRODUCTION

Acute Respiratory Infection (ARI) is a disease of the upper or lower respiratory tract, usually contagious, which can cause ARI symptoms from asymptomatic disease or mild infections to severe and deadly diseases, depending on the causative pathogen, environmental factors and host factors (1). Acute Respiratory Infections (ARI) can attack an ARI of ages, often occurring in children under the age of 1-5 year, because his immune system is still low. Toddlers are at risk of developing ARI because one of the factors is the lack of cleanliness of the home environment, such as lack of lighting, temperature, and ventilation, causing humidity in the house. Acute Respiratory Infections (ARI) are significant disease-causing infant mortality and often become first ranks in causing infant mortality (2).

World Health Statistics data issued by the World Health Organization (WHO) recorded 201% of under-five deaths in the world due to ISPA (3) in 2018. In Indonesia, based on the results of the Basic Health Research (Riskesdas) in 2018, it shows the prevalence of Acute Respiratory Tract Infections (ARI) in children is 7.5% (4). In 2015 Acute Respiratory Infections in Mojokerto Regency were 5,708 cases, and in 2016 there was an increase to 5,758 cases, and ARI was the ten most significant types of disease (5).

The research results of Dewi (6) in the Working Area of the Gayams ARI Community Health Center in Semarang City showed that children suffering from ARI in the work area of Gayams ARI Public Health Center in Semarang City were 68.2% and 31.8%. The area of ventilation that does not meet the requirements makes 84.2% of children suffering from ARI, bedroom occupancy density that does not meet the criteria as much as 52.2%, lighting in homes that do not meet the requirements as much as 52.4%. The results of the study by Meita et al. (7) in Tanjung Mulia Village, Tanjung Merbau Subdistrict, Deli Serdang District, showed that there were 73.3% of children under five suffering from ARI. Houses that have ventilation meet the requirements, there are 59.3% of children under five who suffer from ARI, while those from homes that do not meet the criteria have 84.85% of children suffering from ARI.

The results of preliminary studies conducted in Purworejo Hamlet, Purworejo Village, Pungging Sub-District, Mojokerto Regency found that from 10 families with toddlers showed that seven children under five (70%) experienced symptoms of cough, runny nose, fever more than twice in the past one year. Three of the children (30 %) experience symptoms of cough, runny nose, fever accompanied by shortness of breath (wheezing). The results from observation showed that two houses (20%) semi-permanent (front walled walls, back with wooden walls), three residences (30%) yet.

Family latrines, 6 (60%) dispose of toddler droppings and garbage into the river. Risk factors related to the incidence of ARI include age, sex, nutritional status, low birth weight (LBW), ASI status, immunization status, and environment. One of the factors that cause ARI is the physical environment and maintenance of the home environment, which significantly affects the occurrence of ARI. If the physical environment such as air, humidity, water, air pollution, and lack of cleanliness around the house. ISPA is a disease that spreads through the air and enters the body through the airways so that air epidemiologically has a significant role in the transmission of respiratory tract infections (8).

Prevention efforts are the most strategic component to eradicate ARI in children by maintaining the cleanliness of the home environment. Maintenance of the home environment by maintaining cleanliness in the house, regulating the exchange of air in the house, maintaining the cleanliness of the environment outside the house and trying to get sunlight into the house during the day, so that the air defense in the house is clean so it can prevent germs from entering and multiplying and prevent the occurrence of Acute Respiratory Infections (ARI) (4,9).

Prevention efforts that can be carried out by the family so that children not affected by ARI include maintaining a clean and healthy environment, complete immunization and exclusive breastfeeding for six months and continuing until the age of 2 years. In addition, home care efforts are significant in efforts management of children with acute respiratory infections. In order to reduce Under-five Mortality Rate caused by ISPA, the government has made ARI policy nationally, among others, through finding ARI toddlers as early as possible in primary health services. Managing cases and referrals, integrating with cross-programs through MTBS approach (Integrated Management of Sick Children) in the Puskesmas and the provision of medicines and equipment for the Puskesmas Kesehatan and remote areas (10).

OBJECTIVE

The study aimed to examine the relationship between the cleanliness of the home environment with the incidence of ARI in children under five in the Pungging Community Health Center, Pungging District, Mojokerto Regency.

METHOD

The cross-sectional study design was applied in this study to examine the relationship between a dependent variable and an independent variable. We selected samples from 136 populations and obtained 66 samples for this study. We recruited samples by using simple random sampling. This study was conducted at Purworejo village Pungging District, Mojokerto Regency. The independent variable in this study is the cleanliness of the home environment. The dependent variable in this study is the incidence of ARI. In this study, the instrument was in the form of a healthy home assessment form (11) to identify the cleanliness of the home environment, as well as medical records, to determine the ARI able incidence of ARI. In this study, the instrument in the form of a healthy home assessment form (DG PPM and PLP, 2002) (11) to identify the cleanliness of the home environment, as well as medical records, to determine the variable occurrence of ARI. Researchers do the scoring following the assessment of a healthy home Score = Value x Weight and Then interpreted as a healthy home if the score is 1068 – 1200, and The house is not healthy if the score <1068. In conducting this research, the researcher received a recommendation from STIKES Bina Sehat PPNI Mojokerto Regency and applied it to the Head of Purworejo Village, Pungging District, Mojokerto Regency to obtain approval for research. Ethics that must be done in research are Informed consent, Anonymity, Confidentiality

RESULTS

Characteristics of Respondents

Table 1 shows that the majority of respondents were 13-24 months old, as many as 43 people (65.2%). The majority of respondents were women, as many as 36 people (54.5%). That most respondents did not get exclusive breastfeeding as many as 34 people (51.5%)., almost all respondents birth weight 2500-4000 grams, as many as 63 people (95.5%). Nearly all respondents did not use firewood as many as 55 people (83.3%), that all respondents did not use mosquito repellent as many as 56 people (84.8%), and almost all parents have smoking habits in the home as many as 63 people (95.5%) (see table 1).

Table 1 Characteristics of respondents

Age of toddler	F	%
13-24 Month	43	65.2
25-36 Month	14	21.2
37-48 Month	3	4.5
49-60 Month	6	9.1
Gender		
Man	30	45.5
Woman	36	54.5
Breastfeeding status		
Exclusive	32	48.5
No exclusive	34	51.5
Birth Weight		
< 2500 grams	3	4.5
2500-4000 grams	63	95.5
Usage of Firewood		
Yes	11	16.7
No	55	83.3
Usage of Mosquito Repellent		
Yes	10	15.2
No	56	84.8
Smoking Habits in the House		
Yes	63	95.5
No	3	4.5

Cleanliness of Home Environment

Table 2 described the cleanliness of home environment. The findings showed that the majority of home environment cleanliness were classified as healthy houses, which are 36 respondents (54.5%).

Table 2 Frequency of Cleanliness of Home Environment

No	Cleanliness of the home environment	F	%
1	not healthy	30	45.5
2	Healthy	36	54.5
	Score	66	100.0

Incidence of Acute Respiratory Infections

Table 3 described the incidence of acute respiratory infections. The findings showed that more than half of the patients were not an acute respiratory infection. While 47% of them have experience in acute respiratory infections (53%).

Table 3. Incidence of acute respiratory infections

No	I Incidence of acute respiratory infections	F	%
1	Yes	31	47,0
2	No	35	53,0
	Total	66	100

Cross Tabulation of Home Environment Cleanliness with Incidence of Acute Respiratory Infections

Table 4 shows that almost half of the respondents (47%) of respondents with healthy homes were not affected by ARI, and nearly half (39.5%) of respondents with unhealthy homes were affected by ARI. The results of the Spearman Rho test show that p-value = 0,000 <α = 0.05 so that H1 is accepted and H0 is rejected, which means there is a relationship between the cleanliness of the home environment with the incidence of ARI in children under five in the Pungging Health Center Pungging District Mojokerto Regency.

Table 4 Cross Tabulation of Home Environment Cleanliness with Incidence of Acute Respiratory Infections

Cleanliness of the home environment	ISPA event				Score	
	ISPA		No ISPA			
	F	%	F	%	f	%
No healthy	26	39.5	4	6.0	30	45.5
Healthy	5	7.5	31	47.0	36	54.5
Score	31	47,0	35	53,0	66	100

DISCUSSION

Cleanliness of the House Environment in the Pungging Community Health Center Working Area in Pungging District, Mojokerto Regency

The results showed that the respondent's houses were permanently walled from the wall, had clean water sources that met the requirements, and had gooseneck latrines that were flowed into the septic tank. Based on table 1 shows that the majority of respondents in the cleanliness of their home environment are classified as healthy houses as many as 36 respondents (54.5%).

A house is a building for habitable residence, means of fostering family, a reflection of the dignity of its inhabitants, as well as assets for its owner (12). According to Mundiatun (13), healthy homes must have floors, permanent walls, roofs, sturdy pillars, adequate ventilation, good lighting, clean water facilities available, and available means of disposal of waste and garbage. According to the researchers, the cleanliness of the home environment was determined by three indicators, namely the components of home construction, home environmental sanitation, and occupant behavior, which according to tabulation results. Home environmental sanitation gets the highest score from the three indicators. Therefore, good assessment from researchers for clean water, toilet facilities (means sewage disposal, wastewater disposal, and garbage bins (garbage disposal facilities) in the Pungging Health Center Working Area are quite good with an average score of 2.5 indicators. The components of home construction get the same score as occupant behavior, namely the average indicator score of 1.6. The components of home construction include house ceilings, walls, floors, bedroom windows, living room windows, vents, kitchen smoke holes, and lighting. The lowest score is in the bedroom window because the average house does not have a window in the bedroom, mostly in the living room. The behavior of residents who were the lowest score is the behavior of disposing of garbage in its place because there are still many homes with waste scattered around the house. Whereas, good behavior is cleaning the house and yard since almost all houses clean the house and yard every day.

Incidence of Acute Respiratory Infections in Pungging Health Center Pungging District, Mojokerto Regency

The results of the randomization of the sample showed that the respondents were registered in the medical records of the Pungging Health Center for the period November 2018, December 2018, and January 2019 as many as 31 children. Based on table 9 shows that most did not experience ARI, as many as 35 children (53%). ARI events are influenced by age, gender, immunization status, hygiene home environment, exclusive breastfeeding status, birth weight, air pollution in the house besides coming from outside the room can also come from sources of pollutants in the house. It may also come from the activities of its inhabitants, among others, the usage of biomass for cooking and heating, smoke from lighting sources that use fuel, cigarette smoke, the use of mosquito repellent, volatile organic solvents (formaldehyde)(14).

The development of technology makes environmental pollution even worse, and pathogenic microorganisms are also getting more robust. Thus it is easier to attack people, especially children, because the child's immune system is not as strong as adults. Children who do not experience ARI are 21 children who are still very young, under the age of 2 years, always get breast milk from their mothers. It made antibodies come from mother to body, even only small amounts of milk. Children less than two years old still consume foods that are not too arbitrary because they cannot buy their diet compared to older children (4 or 5 years). Thus, exposure to foods that stimulate coughing is lower than older children, while children> 2 years that do not experience ARI due to exposure to substances. It may cause ARI to have exclusive breast milk routes, healthy environmental conditions not exposed to large amounts of smoke that cause ARI.

Correlation between home cleanliness with Incidence of Acute Respiratory Infections among children in the Pungging Community Health Center Working Area in Pungging District, Mojokerto Regenc

Table 4 shows that almost half of the respondents (47%) with healthy homes were not affected by ISPA, and nearly half (39.5%) of respondents with unhealthy homes were affected by ISPA. The results of the Spearman Rho test show that value = 0,000 <α = 0.05 so that H1 is accepted and H0 is rejected, which means there is a correlation between the cleanliness of the home environment with the incidence of ARI in children under five in the Pungging Health Center Pungging District Mojokerto Regency. Environmental conditions that are not an environmental health threat that is the cause of acute respiratory infection among infants. Occupancy density can affect air quality at the house, where the more number of occupants, the faster the air in the home will experience pollution (14).

According to the researchers, unhealthy homes will cause a lot of pollution, including house air pollution, which is rarely cleaned, windows that are not opened every day so that air circulation is not good. This will cause accumulation of dust in homes where dust is one of the causes of ARI due to dust pushing cilia into the airway will stimulate the mucous glands to produce large amounts of mucus, which obstructs the airways until the child becomes coughed and suffocated. Poor air circulation will cause the environment to become very humid, which is not suitable for breathing because more water vapor enters the airways, which causes ARI. A healthy home will provide a sense of comfort and clean air so that children avoid ARI.

There is one child with an unhealthy home environment but not affected by ARI. Unsanitary housing conditions are caused by the absence of a house ceiling, not having a bedroom window so that it does not open the bedroom window every day. Data from 4

children showed that all four received exclusive breastfeeding and minimal smoke exposure. According to the World Health Organization (3), exclusive breastfeeding is done to avoid allergies and ensure the health of babies optimally. Breast milk contains antibody factors that block ARI types of microorganisms in the respiratory tract so that it can prevent the occurrence of ARI (15).

This is following the theory that children get exclusive breastfeeding so that they have a healthier body resistance than children who do not get exclusive breastfeeding. Besides that, there is not much exposure to smoke so that exposure to substances that cause ARI is not too large. There are five children with a healthy home environment but suffering from ARI. Data from 5 children showed that children were often exposed to smoke from smoking, firewood, mosquito repellent, and birth weight <2500 grams.

The unhealthy environment was due to air pollution such as smoke from forest fires, exhaust gases from transportation facilities. In addition, indoor air pollution such as kitchen fumes, cigarette smoke, and smoke from mosquito coils, is a health threat environment, which is the cause of ARI in infants (14). Following this theory, children who experience ARI even though their homes are classified as healthy homes are caused by parents using mosquito coils and smoking habits in the house. Mosquito coils and cigarettes contain chemicals that are harmful to breathing, causing ARI. Besides that, it is also due to birth weight is<2500 grams so that it is susceptible to infectious diseases because of the incomplete immune system at birth.

Table 1 shows that the majority of respondents were 13-24 months old, 43 people (65.2%). 33.3% of respondents were 13-24 years old and had ARI. The age factor of children influences the incidence of acute respiratory infection, especially pneumonia in infants and toddlers. Infants aged less than two months have a higher risk of developing pneumonia compared to children aged two months to 5 years (8). According to researchers, the age of 13-24 months is the youngest in the respondents, where the majority of the youngest children experience an acute respiratory infection. This is because children at a very young age are still not perfect so that their immune systems are more susceptible to infectious diseases such as ARI.

The majority of respondents were women, as many as 36 people (54.5%). 33.3% of girls did not experience ARI. There is a tendency for boys to get infections more often than girls, but have not shown the factors that influence them (16). According to researchers, the trend of boys to get an infection can be due to more active and exploratory activities of girls. Hence, the possibility of experiencing ARI is also higher. Most respondents did not get exclusive breastfeeding as many as 34 people (51.4%). 33.3% did not get exclusive breastfeeding and experienced ARI, and 34.8% of respondents received exclusive breastfeeding and did not experience ARI. According to the World Health Organization (3), exclusive breastfeeding is done to avoid allergies and ensure the health of babies optimally. ASI contains antibody factors that block acute respiratory infection types of microorganisms in the respiratory tract so that it can prevent the occurrence of acute respiratory infection (15). Exclusive breastfeeding includes antibodies that are not obtained from other milk. Thus children who get exclusive breastfeeding are more resistant to diseases, including disease infections such as ARI. Children who do not get exclusive breastfeeding will not get antibodies from mothers as many as children who get exclusive breastfeeding so that they are more easily experience pain.

Table 1 shows that almost all respondents birth weight 2500-4000 grams, as many as 63 people (95.5%). 53% of respondents' birth weight 2500-4000 grams and did not experience ARI. Low birth weight is defined as a birth weight of fewer than 2500 grams. Infants with Low Birth Weight (LBW) will increase the risk of morbidity and infant mortality because babies are susceptible to conditions of lower respiratory tract infections (17). This

shows that babies with low birth weight are at risk of developing an infectious disease, although not infrequently, it also occurs in infants with normal birth weight. Infants with low birth weight are more susceptible to infection because the body's defense system is not as good as a child with normal birth weight. After all, LBW babies tend to be born to mothers with complications during pregnancy, such as being born prematurely so that the body's defenses are not fully formed because it is not yet born.

Based on table 1, it is known that almost all respondents did not use firewood as many as 55 people (83.3%). 53% of respondents did not use firewood and did not experience ARI. The unhealthy environment due to air pollution such as air pollution in households such as kitchen fumes (14). According to researchers, firewood smoke irritates the respiratory tract. This can cause the movement of the cilia to be slow, even stop, so the mechanism of cleaning the respiratory tract becomes disrupted. Respondents who do not use firewood can also experience acute respiratory infection because of other factors.

Based on table 1, it is known that all respondents did not use mosquito coils as many as 56 people (84.8%). 50% of respondents who did not use mosquito coils did not experience ARI. The use of mosquito repellent as a tool to avoid mosquito bites can cause respiratory tract disorders due to the result of unpleasant smoke and odor. The presence of air pollution in the home environment will damage the lung defense mechanism, thereby facilitating the emergence of respiratory disorders (18,21). In general, the effect of air pollution on the respiratory tract can cause ARI. Parents who use mosquito coils but their children do not experience ARI because some brands of mosquito coils do not emit large amounts of smoke. Older people use mosquito coils before the room is used by their children to sleep so that children are not exposed to smoke, which can cause ARI (20).

Table 1 shows that almost all parents have smoking habits in the home as many as 63 people (95.5%). Respondents who experienced acute respiratory infection were 95.7% of respondents who had family members who smoked, and respondents who experienced ARI, not ARI, namely 79.2% of respondents who did not have family members smoked. Cigarette smoke from parents or residents of a one-stop house with toddlers is a material of pollution in a living space that is serious and will increase the risk of pain from toxic substances in children. Continuous exposure will cause respiratory problems, especially aggravating the incidence of acute respiratory infections and lung disorders as adults. The more cigarettes smoked by the family, the higher the risk for the incidence of ARI, mainly if smoking is carried out by the mother of the baby (19).

This shows that acute respiratory infection that occurs in infants is very dominant due to family members who smoke. As is known, cigarette smoke contains substances that irritate the airways, causing infection. Respondents who have families smoke there is no- ARI because smoking when doors and windows are wide open. Thus, smoke does not accumulate in the house, or it can be in the room when the child is not in the room, because parents also understand that children are still very vulnerable to smoke cigarettes. Therefore, avoiding their children when smoking. Children who do not have family members smoke, but ARI is caused by low birth weight and not being given exclusive breastfeeding so that their body defenses are weak.

CONCLUSION

The home cleanliness is a crucial aspect of reducing the incidence of acute respiratory infection. This study concluded that there is a correlation between the cleanliness of the home environment with the incidence of acute respiratory infection among children under five in the Pungging Community Health Center Pungging District Mojokerto Regency.

RECOMMENDATION

Parents are expected to add insight about the prevention of ARI so that they can apply it in their daily lives to prevent ARI in infants, paying attention to the cleanliness of the home environment more diligently cleaning the house. Increasing ventilation for those who lack ventilation, opening windows every day and avoiding smoke exposure to toddlers, both from fuelwood, mosquito coils or from cigarettes. In addition, it is expected that the Pungging Health Center will conduct counseling on prevention of ARI transmission and conduct environmental care. Lastly, further research needs to conduct a study to identify factors that cause ARI because no determinant factors are causing ARI.

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