

Level of Respiratory Transmitting Infection Based on Physical Sanitation of the House of Toddler in the Village Punjul Plosoklaten Kediri Regency

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ABSTRACT

Environment-based diseases contribute more than 80% of diseases experienced by infants and toddlers in Indonesia. This situation indicates that the coverage and quality of environmental health interventions in Indonesia is still low. The research objective is to analyze the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency. The design of this research is experimental quantitative research with the focus of the research being directed at analyzing the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency with a population of 46 respondents and a sample of 41 respondents who were drawn by the simple random sampling technique. The findings found that almost half of the respondents have good category physical sanitation as many as 15 respondents (36.6%). Most of the respondents had symptoms of ARI as many as 23 respondents (56.1%). The results of the study used the test *Logistic Regression* indicates that the p-value is $0.001 < 0.05$, then H1 is accepted, so it is concluded that there is the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency. People who have occupancy density that are not in accordance with health requirements need to rearrange the number of occupants of the toddler's bedroom to prevent ARI in toddlers. If it is not possible to regulate the density of the occupancy, efforts will be made so that in the toddler's bedroom there is a process of good air circulation.

Keywords: infection, sanitation, toddler

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BACKGROUND

Environment-based diseases contribute more than 80% of diseases experienced by infants and toddlers in Indonesia. This situation indicates that the coverage and quality of environmental health interventions in Indonesia is still low (Badan Pusat Statistik, 2016). Acute respiratory infection (ARI) is one of the leading causes of death in children in developing countries. ARI causes 15 million deaths of children under 5 years of age each year. (Mayasari, 2011). The cause of ARI is a virus or bacteria. The main viruses that cause ARI are Rhinovirus and Coronavirus. Other viruses that also cause ARI are the Parainfluenza virus, Respiratory syncytial virus, and Adenovirus. (Aprilla et al., 2019).

According to the World Health Organization (WHO), 2016 the incidence of ARI in countries such as America, Africa and countries on the Asian continent in 2016 is estimated that there are deaths over 40 per 1000 live births, which is 15% -20% per year in the under-five age group. (Sabri et al., 2019) According to (Riskesdas 2018) the prevalence of ARI disease incidence in Indonesia decreased by 4.4%. For the East Java region, the prevalence of ARI disease was 5.99%.

Based on the results of a preliminary study conducted by researchers on September 27, 2020 at Punjul Village Plosoklaten Subdistrict, Kediri Regency, to 10 respondents found that most of the respondents had environmental sanitation that was far from ideal, starting with a humidity of more than 60%, where this was due to the lack of available air ventilation at the respondent's house. In addition, it is also due to the lack of light intensity, so that the house tends to be more humid. A total of 7 toddlers (70%) had experienced ARI in the last 1 month, while 3 children under five (30%) had experienced ARI in the last 6 months.

According to Yusup and Sulistyorini (2015), home sanitation that does not meet health requirements such as humidity, temperature, and natural lighting that does not meet the requirements can be a good environment for the proliferation of ARI bacteria and the transmission of ARI disease in toddlers. Toddlers have an immune system that is still susceptible to diseases including ARI (Sukarto, et al, 2016).

Physical home sanitation must be considered. The house must be equipped with a ventilation area of at least 10% of the floor area so that the air exchange is good in the house. The temperature that is allowed in a house is 18°C - 30°C with a humidity of 40% -60%. Humidity must be maintained to be optimal because too high or too low humidity can lead to the proliferation of disease microorganisms. Meanwhile, the natural lighting intensity in the house is at least 60 lux. In addition, PM2.5 levels that are allowed in the house are a maximum of 35µg / m³. PM2.5 levels that exceed the required limit can cause respiratory system disorders such as pneumonia, allergies, eye irritation, and chronic bronchitis (Indonesian Ministry of Health, 2011).

The incidence of ARI disease in children under five is closely related to the relationship between sanitation and the environment, such as the physical condition of the house that does not meet health requirements such as floors, walls, ceilings and roofs. House cleaners that are not cleaned regularly can cause dust in the house. High occupant density In addition to the factor of occupant density, ventilation, temperature and lighting. Houses that do not meet health requirements will affect the health of the occupants of the house, such as improper ventilation installation can cause the process of exchanging air flow from outside into the house not smoothly, so that bacteria that cause ARI that are in the house cannot get out. Ventilation also causes an increase in room humidity due to the process of evaporation of fluids from the skin, (Love & Lamatungga, 2020).

According to research conducted Sabri et al (2019) explained that in the study there were the same things, namely both using the dependent variable. The incidence of ARI in children under five, the difference was the independent variable where in the study (Sabri et

al., 2019) about knowledge, attitudes, exclusive breastfeeding and occupancy density, while this study uses physical house sanitation which includes house ventilation, floors, ceilings, lighting and room occupancy density.

Based on the above conditions, the authors are interested in examining the incidence rate of ARI based on physical home sanitation in children under five in Punjul Village Plosoklaten District, Kediri Regency.

METHODS

In this study, researchers used an experimental quantitative design with an approach *twogroup pre test and post test design* that is the measurement of knowledge is carried out in two different times. The initial measurement 01 (pre test) is carried out before any treatment or intervention is then given an intervention in the form of health promotion using flipchart media and videos on preventing early stunting and the final measurement 02 (post test) which is carried out after the treatment (treatment) or intervention (Arikunto, 2012). This research will analyze the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency with a population of 46 respondents and a sample of 41 respondents who were drawn by the simple random sampling technique.

RESULTS

Pair Test

Table 1 Logistic Regression Analysis Results the incidence rate of ARI based on physical house sanitation in children under five in Punjul Village, Plosoklaten District, Kediri Regency which was carried out by researchers on 17-28 March 2021 with 41 respondents.

| No. | Variable | Sig. | Odd Ratio | Hosmer |
|-----|---------------------|-------|-----------|--------|
| 1 | Physical Sanitation | 0.001 | 0.421 | 0.623 |
| 2 | Constant | 0.001 | 9880,687 | |

Based on the results of the Logistic Regression analysis, it shows that the p-value is $0.001 < 0.05$, then H1 is accepted, so it is concluded that there is the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency.

Based on the results of the analysis of the Hosmer and Lemeshow Test, it shows that the value is $0.623 > 0.05$ H1 is accepted so it can be concluded that there is a match between the independent variable and the dependent variable. In addition, the Odd Ratio value obtained is 0.421, which means that respondents with good sanitation will have a risk of developing ARI by 0.421 times compared to respondents who have poor sanitation.

DISCUSSION

Physical Sanitation of Houses in Punjul Village, Plosoklaten District, Kediri Regency

The results showed that almost half of the respondents had good category physical sanitation as many as 15 respondents (36.6%). In addition, 13 respondents (31.7%) had adequate physical sanitation. Meanwhile, 13 respondents (31.7%) also had poor physical sanitation.

According to Notoatmodjo (2013), a house whose ventilation area does not meet health requirements will affect the health of the occupants of the house, this is because the process of exchanging air flow from outside into the house is not smooth, so the bacteria that cause ARI disease in the house cannot come out. Ventilation also causes an increase in room humidity due to the process of evaporation of fluids from the skin, therefore high room humidity will be a good medium for the proliferation of bacteria that cause ARI disease.

Home and environmental sanitation is closely related to the incidence of infectious

diseases, especially ARI (Taylor, 2012). Some things that can affect the incidence of ARI in children under five are the physical condition of the house, the cleanliness of the house, the density of residents and indoor air pollution (Iswarini and Wahyu, 2011). Besides that, there are also factors of occupant density, ventilation, temperature and lighting (Ambarwati and Dina, 2012).

According to Ranuh (2012), a house with a window that does not meet the requirements causes air exchange to not take place properly, as a result kitchen smoke and cigarette smoke can collect in the house, babies and children who often smoke in the house are more susceptible to ARI. The house is damp and wet because a lot of water is absorbed on the walls and the morning sunlight which is difficult to enter the house also makes it easier for children to catch ARI. Based on the research results of Yusup and Sulistyorini (2015), it is known that there is a significant relationship between ventilation, lighting and occupant density with the incidence of ARI in children under five.

Physical home sanitation must be considered. The house must be equipped with a ventilation area of at least 10% of the floor area so that the air exchange is good in the house. The temperature that is allowed in a house is 18°C - 30°C with a humidity of 40% - 60%. Humidity must be maintained to be optimal because too high or too low humidity can lead to the proliferation of disease microorganisms. Meanwhile, the natural lighting intensity in the house is at least 60 lux. In addition, PM2.5 levels that are allowed in the house are a maximum of 35µg / m³. PM2.5 levels that exceed the required limit can cause respiratory system disorders such as pneumonia, allergies, eye irritation, and chronic bronchitis (Indonesian Ministry of Health, 2011).

According to researchers, good physical sanitation in a house can make the ecosystem of life more qualified, starting from health, comfort level, and even a feeling of security about something. Lack of physical sanitation can cause discomfort due to the condition of the air that feels not fresh and humid, making someone wear thick clothes too often, or vice versa, they often take off their clothes because the room temperature feels hot. Long-term discomfort with the physical sanitation of the house can disrupt the quality of health in the family.

The Incidence Rate of ARI in Toddlers in Punjul Village, Plosoklaten District, Kediri Regency

The results showed that most of the respondents had symptoms of ARI as many as 23 respondents (56.1%). Meanwhile, 18 respondents (43.9%) did not have symptoms of ARI. ARI is an acute respiratory tract disease which includes the upper respiratory tract such as rhinitis, pharyngitis, and otitis as well as lower respiratory tract such as laryngitis, bronchitis, bronchiolitis, and pneumonia which can last for 14 days. A time limit of 14 days is taken to determine the acute extent of the disease. The respiratory tract is the organ from the nose to the alveoli along with organs such as the sinuses, middle ear space and pleura (Malinda et al., 2019).

Acute Respiratory Infection (ARI) is a major cause of morbidity and mortality of infectious diseases worldwide. Nearly four million people die from ARI each year (WHO, 2012). ARI is one of the health problems that exist in developing and developed countries. This is due to the high morbidity and mortality rates due to ARI, especially in infants and toddlers.

According to WHO (2013) ARI can occur due to the transmission of organisms through AC (air conditioner), droplets and through the hands which can be a way of entry for viruses. Pharyngitis transmission occurs through droplets, germs infiltrate the epithelial layer, if the epithelium is eroded, the superficial lymphoid tissue reacts so that inflammation occurs with polymorphonuclear leukocyte infiltration. In sinusitis, when an ARI occurs through a virus, the nose will secrete mucus which can produce bacterial superinfection, which can cause pathogenic bacteria to enter the sinus cavities.

The bacteria that cause ARI are Genus Streptococcus, Staphylococcus, Pneumococcus, Hemophilus, Bordetella and Corynebacterium. Staphylococcus grows in an environment with a temperature of 15 - 45°C, while Streptococcus grows in an environment with a temperature of 37°C. Viruses that cause ARI include the Mypesvirus, Adenovirus, Coronavirus, Pikomavirus, Mycooplasma, Herpesvirus and others. (Luhukay et al., 2018).

According to researchers, toddlers can easily experience a certain disorder or disease, because at that age they are still vulnerable to responding to bad environmental conditions. Toddlers who experience ARI disease with the majority of symptoms experienced are fever accompanied by cough and runny nose.

The occurrence of fever accompanied by a cold cough is the result of less than ideal environmental conditions where the air flow is not good and also the humidity is bad so that toddlers are prone to health problems, especially respiratory problems. Therefore, parents must maintain the immunity of toddlers so that they are not susceptible to ARI by providing food with balanced nutrition, in addition, parents must also maintain the condition of the home environment, especially the physical house sanitation to keep it safe and healthy for toddlers.

The Effect of House Physical Sanitation on the Incidence Rate of Ispa in Toddlers in Punjul Village, Plosoklaten District, Kediri Regency

Based on the results of the Logistic Regression analysis, it shows that the p-value is $0.001 < 0.05$, then H1 is accepted, so it is concluded that there is the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village Plosoklaten District, Kediri Regency. Based on the results of the cross tabulation, it is known that almost half of the respondents who have poor physical sanitation also have symptoms of ARI as many as 13 respondents (31.7%).

Environment-based diseases contribute more than 80% of diseases experienced by infants and toddlers in Indonesia. This situation indicates that the coverage and quality of environmental health interventions in Indonesia is still low (Badan Pusat Statistik, 2016). Acute respiratory infection (ARI) is one of the leading causes of death in children in developing countries. ARI causes 15 million deaths of children under 5 years of age each year. (Mayasari, 2011). The cause of ARI is a virus or bacteria. The main viruses that cause ARI are Rhinovirus and Coronavirus. Other viruses that also cause ARI are the Parainfluenza virus, Respiratory syncytial virus, and Adenovirus. (Aprilla et al., 2019).

According to Yusup and Sulistyorini (2015), home sanitation that does not meet health requirements such as humidity, temperature, and natural lighting that does not meet the requirements can be a good environment for the proliferation of ARI bacteria and the transmission of ARI disease in toddlers. Toddlers have an immune system that is still susceptible to diseases including ARI (Sukarto, et al, 2016).

The incidence of ARI disease in children under five is closely related to the relationship between sanitation and the environment, such as the physical condition of the house that does not meet health requirements such as floors, walls, ceilings and roofs. House cleaners that are not cleaned regularly can cause dust in the house. High occupant density in addition to the factor of occupant density, ventilation, temperature and lighting. Houses that do not meet health requirements will affect the health of the occupants of the house, such as improper ventilation installation can cause the process of exchanging air flow from outside into the house not smoothly, so that bacteria that cause ARI that are in the house cannot get out. Ventilation also causes an increase in room humidity due to the process of evaporation of fluids from the skin, (Love & Lamatunga, 2020).

According to research conducted Sabri et al (2019) explained that in the study there were the same things, namely both using the dependent variable. The incidence of ARI in children under five, the difference was the independent variable where in the study (Sabri et al., 2019) about knowledge, attitudes, exclusive breastfeeding and occupancy density, while

this study uses physical house sanitation which includes house ventilation, floors, ceilings, lighting and room occupancy density.

The results of this study are in accordance with the research conducted by Asriati et al. (2015) which shows the results if the density of the occupancy can increase humidity due to moisture from breathing followed by an increase in carbon dioxide (CO₂) in the room, a decrease in oxygen levels, causing a decrease in air quality in the house. causes the immune system of the occupants to decrease and makes it easier for gas or bacterial contamination to quickly cause respiratory diseases such as ARI.

According to researchers, occupancy density can affect toddlers experiencing ARI because occupancy with high density levels will increase the temperature and humidity in the room due to heat dissipation from the breathing of the occupants. If the humidity is high, it will become a medium that supports the proliferation of agents that cause ARI and accelerates the transmission of ARI. Based on the results of the cross tabulation conducted by the researcher, it was found that respondents who had physical sanitation in the poor category, their toddlers tended to experience symptoms of ARI where the house felt very humid with the air ventilation not draining properly, sometimes it felt hot and the house looked messy.

However, there are still two respondents who have physical sanitation in the good category but experience symptoms of ARI in their senses, this is due to the behavior of parents who like to consume ice cream or cold drinks to toddlers, which causes toddlers to experience symptoms of ARI quite often. So based on this, people who have an occupancy density that is not in accordance with health requirements need to rearrange the number of residents in the toddler's bedroom to prevent the occurrence of ARI in toddlers. If it is not possible to regulate the density of the occupancy, efforts will be made so that in the toddler's bedroom a good air circulation process occurs. So based on this, people who have an occupancy density that is not in accordance with health requirements need to rearrange the number of residents in the toddler's bedroom to prevent the occurrence of ARI in toddlers. If it is not possible to regulate the density of the occupancy, efforts will be made so that in the toddler's bedroom a good air circulation process occurs. So based on this, people who have an occupancy density that is not in accordance with health requirements need to rearrange the number of residents in the toddler's bedroom to prevent the occurrence of ARI in toddlers. If it is not possible to regulate the density of the occupancy, efforts will be made so that in the toddler's bedroom a good air circulation process occurs.

CONCLUSION

1. Nearly half of the respondents have good category physical sanitation as many as 15 respondents (36.6%).
2. Most of the respondents 23 respondents (56.1%) had symptoms of ARI.
3. There is the effect of physical house sanitation on the incidence rate of ARI among children under five in Punjul Village, Plosoklaten District, Kediri Regency.

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