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# RELATIONSHIP OF VENTILATION AND WASTE MANAGEMENT WITH ACUTE RESPIRATORY INFECTION EVENT IN BANJARSARI WETAN VILLAGE IN 2021

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***ABSTRACT***

*Acute Respiratory Infection (ARI) is one of several diseases that attack one part or more of the respiratory tract. The spread of ARI starts from the upper channel to the lower channel. ARI often occupies the top 10 list of diseases in the health center. ARI continues to be a health problem in Indonesia because it has a huge impact on the sufferer, besides that ARI can also trigger the emergence of other diseases. The purpose of this study was to analyze the relationship between ventilation and waste management with the incidence of ARI in Banjarsari Wetan Village in 2021. This study was an observational study using a case control study design, observations and interviews were also used to obtain data. The study population was all ARI patients who were treated at the Polindes. This research uses purposive sampling technique. And Chi-Square Test to analyze the research results. ventilation of the majority of respondents did not meet the criteria as many as 29 (51.8%). Ventilation and waste management were not found to be related to the incidence of ARI in Banjarsari Wetan Village in 2021. The village head and the village midwife of Banjarsari Wetan should be able to carry out house monitoring that can be adjusted to the requirements of a healthy house, besides that, socialization about environmental-based diseases that can occur due to unhealthy home environmental conditions can also be carried out.*

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## INTRODUCTION

Health is a basic human need that is used as a determinant of self-quality. Health is also used as a condition to be able to do activities optimally which will affect a person's performance and productivity. Six health issues will be the focus of the Ministry of Health (Kemenkes) in 2021, one of the problems of the six issues is increasing control of infectious and non-communicable diseases and strengthening health security for handling pandemics (Rokom, 2021). Infectious disease is a disease caused by the presence of microorganisms, such as viruses, parasites, and bacteria (Agustin, 2021). One of the infectious diseases is an acute respiratory infection or can be shortened to ARI, where ARI is one of several diseases that attack one part and or more of the respiratory tract. The spread of ARI starts from the upper channel to the lower channel (Afifah, 2013).

A report from Nastiti Kaswandani as Head of the Respiratory Coordination Working Unit of the Indonesian Pediatrician Association (IDAI) stated that in 2016 WHO published a report that nearly 6 million children under five died and 16% of that number was caused by ARI (Dwinanda, 2016). Based on the results of the 2018 Riskesdas, it was found that the prevalence of ARI in Indonesia based on the diagnosis of health workers and symptoms in 2018 was 9.3%(Kementerian Kesehatan Republik Indonesia, 2018). Meanwhile, the prevalence of ARI in East Java and in Madiun Regency based on the diagnosis or symptoms experienced by respondents was 9.54% and 6.89% (Riskesdas Jatim, 2018). There are 10 environmental-based diseases at the Jetis Health Center which are sanitarians concerned with preventing and controlling. One of the diseases with the highest cases among the 10 diseases is ARI. The number of cases of ARI in 2020 in the working area of the Puskesmas Jetis was 703 cases. According to data from the Polindes of Banjarsari Wetan Village in 2020, 99 cases were found. Meanwhile, in 2021, 64 cases of ARI were found.

Acute Respiratory Infections are influenced by external and internal factors. External factors are the physical environment of the house (occupancy density, ventilation, lighting, dust levels in the house, kitchen smoke holes and building construction) (Putri, 2019). In addition, air pollution originating from transportation facilities and burning waste can also trigger ARI disease (Celesta and Fitriyah, 2019; Zolanda, Raharjo and Setiani, 2021). While the internal factors are gender, age and nutritional status (Putri, 2019).

The results of study (Yustati, 2020) obtained p-value of 0.000 which means that there is a significant relationship between ventilation and the incidence of ARI in children under five. This can happen because some of the respondent's houses have ventilation, but the ventilation is only in the front room, while in the family rooms and rooms there is no ventilation so it can cause health problems. Based on the results of (Sudirman *et al.*, 2020) research, the results of p-value = 0, which means that there is a relationship between home ventilation and the incidence of ARI in toddlers in the Juntinyuat Health Center work area in 2018.

The results of research (Harto, 2020) show that there is a relationship between home ventilation and the incidence of ARI in toddlers at the Sukaraya Health Center. This happens because the existing houses do not have sufficient ventilation requirements to filter the air that enters the house. The relatively high humidity conditions in the Sukaraya and its surroundings are not accompanied by an ideal home construction adjustment with health requirements. Coupled with the level of population density where houses are lined up close to each other makes the atmosphere is quite stuffy so that the seeds of disease are trapped in one room and make it grow very quickly, both through person-to-person transmission and through the growth of the disease virus.

Garbage can affect health and the environment. Waste management can be done in several ways, one of which is

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open burning. According to (Daffi, Chaimang and Alfa, 2020) open burning of waste can emit harmful gases into the atmosphere. Large amounts of greenhouse gases such as carbon dioxide, methane, and particulate matter are released into the atmosphere as a result of open burning. Open burning of waste can cause air pollution and health risks for those who are directly exposed to the smoke (Babayemi JO, Dauda KT, and Igoni AH, Ayotamuno MJ, Ogaji SOT, Probert SD).

Based on the results of the study (Setiawan, Heriyani and Biworo, 2020) it was found that there was an association between the act of burning open waste and ARI (p = 0.024). This can happen because several people live in the area who burn garbage openly. After all, the Temporary Shelters (TPS) in the area are far from where the residents live.

ARI often occupies the 10 highest list of diseases in Puskesmas. ARI continues to be a health problem in Indonesia because it has enormous consequences for sufferers, besides that ARI can also trigger the emergence of other diseases. For this reason, it is necessary to take promotive, preventive and control measures so that people are more aware and more concerned about maintaining their health and the environment. Promotive, preventive and control measures can be taken if the risk factors for ~~a~~ disease are known.

The problem raised in this study is the high number of ARI cases in 2021, where ARI diseases are still classified as the top 10 diseases that are often treated at Polindes Banjarsari Wetan Village. The purpose of this study was to analyze the relationship between ventilation and waste management with the incidence of ARI in Banjarsari Wetan Village in 2021.

## METHODS

This study is an observational study with a case-control, observation and interviews were used to obtain data. The research was conducted in Banjarsari Wetan Village, Dagangan District, Madiun Regency from March to May. The population of this study is a group of ARI cases, namely all ARI patients who seek treatment at the Polindes, Banjarsari Wetan Village, Madiun Regency with a total of 64 cases. The calculation of the lameshow formula was used to find the number of samples and the results obtained were 28 samples of the case group and 28 samples of the control group. This research uses purposive sampling technique. Test Chi-Square to analyze the research results. Case-control was used because in this study we wanted to know the cause of the disease by investigating the relationship between risk factors and the incidence of disease. The research instrument used a checklist and a questionnaire. This research has obtained permission from the Badan Kesatuan Bangsa Dan Politik Dalam Negeri Kabupaten Madiun.

## RESULTS

Table 1. Univariate Analysis

| **Variable** | ***F*** | **%** |
|---|---|---|
| **Ventilation** | | |
| Meets criteria | 27 | 48,2 |
| Does not meet criteria | 29 | 51,8 |
| **Waste Management** | | |
| By burning | 53 | 94,6 |
| By not burning | 3 | 5,4 |

Based on table 1, it can be concluded that ~~the~~ most respondents' ventilation did not meet the criteria as many as 29 (51.8%). Meanwhile, the majority of respondents' waste management was burned by 53 (94.6%).

Table 2. Bivariate Analysis

| **Variable** | **Incidence of ARI** | | ***P-Value (OR = 95%CI)*** |
|---|---|---|---|
| | **ARI** | **No ARI** | |
| **Ventilation** | | | |
| Meets criteria | 10 | 17 | 0,109 (0,395 = 0,122-1,062) |
| Does not meet criteria | 18 | 11 | |
| **Waste Management** | | | |
| By burning | 26 | 27 | 1,000 (0,481 = 0,41-5,636) |
| By not burning | 2 | 1 | |

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Based on table 2, the results of the *Chi-Square* obtained a *P-Value value* = 0.109 which means that there is no relationship between ventilation and the incidence of ARI in Banjarsari Wetan Village in 2021. Ventilation OR value = 0.359 which means that the risk of ARI disease will not increase if the respondent lives in a house where the ventilation of the house meets the criteria. Meanwhile, for waste management, the p-value = 1,000 means that there is no relationship between waste burning and the incidence of ARI in Banjarsari Wetan Village in 2021. Respondents who burn garbage have ~~a~~ 0.4 times more susceptibility to ARI compared to respondents who do not burn their waste (OR = 481).

## DISCUSSION

There is no relationship between ventilation and the incidence of ARI at Polindes Banjarsari Wetan Village in 2021. These results are in line with the results of research (Nova, Rachmawati and Siahainenia, 2021) by obtaining p-value = 0.741, which means that there is no significant relationship between ventilation area and the incidence of ARI in children under five in Sukadanau Village, West Cikarang District, Bekasi Regency.

The results of this study are different with the results of research (Hassen *et al.*, 2020) which states that lack of ventilation is significantly associated with the incidence of ARI. The results of the analysis also found that those who lived in houses without windows had a higher risk of developing ARI (OR = 4.03). The results of the study (Admasie, Kumie and Worku, 2018) also state that the number of doors and windows is very important in increasing home ventilation and is also associated with ARI in children. The chances of developing ARI in children who live in homes with poor ventilation are four times higher than those who live in homes with good ventilation.

Meanwhile (Pasaribu, Santosa and Nurmaini, 2021) found that there was a relationship between air ventilation and the incidence of ARI in children under five in the coastal area of Sibolga City (*p-value* = 0.012), with a value of 1.208 meaning that toddlers living in homes with ventilation < than 10 % of the floor area has 1,208 times the chance of being exposed to ARI compared to those who live in houses that have qualified air ventilation.

The results of the study (Putri and Mantu, 2019) found that there was a relationship between ventilation and the incidence of ARI in children under five in Ciwadan District, Cilegon City (*P-value* = 0.001). The results of the study (Astuti, 2018) also stated that there was a significant relationship between the area of ventilation holes and the incidence of ARI in the female student dormitory of the Assalafi Al Fithrah Islamic Boarding School Surabaya (*P-value* = 0.025).

Ventilation in Banjarsari Wetan does not have a relationship with the incidence of ARI because the respondents have houses with adequate occupancy density so that the air in the house is not too congested.

Waste management has no relationship with the incidence of ARI. The waste processing studied in this study is whether the waste is managed by burning or not burning.

The results of this study are not in line with the results of research (Irianti and Prasetyoputra, 2018) which states that almost half of households burn their waste in the open (48.60%). Open burning of waste at the household and community levels has a significant relationship with the problem of ARI at a young age. The results of the analysis also found that rural children had a higher risk than urban children (OR = 1.06). While the results of the study (Putra and Syahidah, 2020) found that there was a significant relationship between indoor air pollution and the incidence of ARI at Ashari Medika Clinic (*P-value* = 0.003).

Waste management is not related to the incidence of ARI because respondents burn their waste not close to their homes. Some were burned on the vacant lot behind

his house which was more than 10 meters from the house. Some burn their trash only during the dry season, which means that they don't burn trash all the time.

In this study, several limitations may affect the results of the study, namely: the variables that have the potential to cause ARI disease have not been studied, including; climatic conditions, respondent's behavior such as smoking, distance from house to road (which causes air pollution), and others (etc.). And it has not been able to measure all the requirements used as criteria for a healthy home. For example, researchers have not been able to measure temperature, humidity, and air quality.

## CONCLUSION

Ventilation and waste management were not found to be related to the incidence of ARI in Banjarsari Wetan Village in 2021. It is recommended that the village head and the village midwife of Banjarsari Wetan should be able to carry out house monitoring that can be adjusted to the requirements of a healthy house, besides that, socialization about environmental-based diseases that can occur due to unhealthy home environmental conditions can also be carried out. So that the incidence of environmental-based diseases, especially ARI can be decreased, and treatment can be done immediately.

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