

The Relationship of Exposure to Cigarette Smoke in the Room to the Event of Ari on Children in Asembagus Puskesmas Situbondo District

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ABSTRACT

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Acute respiratory tract infection is the process of entry of a microorganism into the respiratory tract organs which can cause an antibody antigen response and lasts up to 14 days. According to the World Health Organization in 2007, ARI is one of the causes of death in children under five in developing countries. One of the risk factors for the occurrence of ARI is due to exposure to cigarette smoke. This study aims to determine the relationship between exposure to cigarette smoke in the room and the incidence of ARI in toddlers at Asembagus Public Health Center, Situbondo Regency.

The type of research used in this study is in the form of an analytical study using a cross sectional approach. The number of population contained in this study were 34 patients under five. Then, after the sampling technique was carried out in the inclusion criteria and exclusion criteria, a total sample of 30 respondents was obtained which were analyzed using the Linear Regression statistical test with the help of SPSS software for windows version 17.

The results showed that the distribution of high and low exposure to cigarette smoke in the room in the respondents found that most of the respondents (73.33%) had a high level of exposure to cigarette smoke. Meanwhile, the distribution of ARI incidence among toddlers, most (63.33%) was at the moderate ARI incidence rate.

From the results of the calculation of the linear regression statistical test, it can be concluded that there is a significant positive relationship of 0.403 between exposure to cigarette smoke in the room to the incidence of ARI in toddlers at Asembagus Public Health Center in 2020.

The level of exposure to cigarette smoke exposure to the incidence of ARI depends on the concentration of cigarette smoke gathered in a closed room according to the number of smokers, the type of cigarette smoked and the characteristics of the room conditions, for example, the size of ventilation, air temperature and humidity, and the habits of toddlers who are in a non-smoking area.

Keywords: Cigarette smoke, ARI, toddlers

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INTRODUCTION

Acute Respiratory Tract Infection (ARI) is one of the most common causes of death for children in developing countries. This Acute Respiratory Infection (ARI) causes 4 out of 15 million deaths in children under the age of 5 years each year (WHO, 2016). This is because infants under the

age of 5 years are in a group that has an immune system that is still very vulnerable to various diseases (Probowo, 2012). In general, there are three risk factors for the occurrence of ARI, namely factors in the living environment, individual factors in toddlers and behavioral factors from toddlers. Environmental factors include: air pollution in the house or room (cigarette smoke and smoke from burning fuel for cooking with high concentrations), ventilation in the house and residential density in the environment. Children's individual factors include: child's age, birth weight, nutritional status of toddlers, vitamin A and immunization status.

In Indonesia, according to the 2016 Household Health Survey, the infant mortality rate due to ARI (pneumonia) is 5 per 1000 children under five each year. This means that every year or almost 300 toddlers every day or 1 toddler every 5 minutes, ARI (pneumonia) causes death in toddlers. (Misnadiarly, 2016).

ARI disease is estimated at 3 to 6 times per year in children under five in Indonesia. Which means that an average toddler in one year will get a cough and cold attack as much as 3 to 6 times. As a group of diseases, ARI is also one of the causes of patients coming to health care facilities. As many as 40% - 60% of medical visits at the puskesmas and 15% - 30% of visits for treatment in the outpatient department and inpatient care in the sick room are caused by ARI. (Dep.Kes.RI, 2015).

Many factors influence the occurrence of ARI, namely age, nutritional status, air pollution, indoor density, immunization, vitamin A deficiency, exposure to cigarette smoke, low birth weight (LBW), breastfeeding and socioeconomic status. Age and gender are factors that cannot be controlled, while the factors of nutritional status, immunization, vitamin A and density of residence have received special attention from the government. It is different with the problem of exposure to cigarette smoke that still occurs, this is evident from the continued increase in the number of smokers in Indonesia. Smoking is one of the habits that are often encountered in everyday life, both men and women, young children and old people, rich and poor, there is no exception. (Bustan, 2007). According to Riskesdas 2020 data, it shows the number of smokers aged 10-18 years has increased sharply from 7.2% (2013) to 8.8% (2016) and then 9.1%.

In 2008 the World Health Organization (WHO) established Indonesia as the third largest country after China and India. as a cigarette user. which reaches 28% per population or 65 million people or (225 billion sticks per year). In Indonesia, more than 60 million people will experience the inability of the effects of the addictive nicotine contained in cigarettes. (F.A Moeloek, 2014). The more cigarettes smoked, the more cigarette smoke enters the respiratory tract, and every year, around 225,700 people in Indonesia die from smoking or other tobacco-related diseases. It is also inseparable for passive smokers, especially for children whose parents smoke will easily suffer from respiratory problems (ARI), (DR.M.N Bustan, 1914)

There are several efforts to reduce the incidence of ARI among toddlers, starting with HE (Health Education) for mothers or families with toddlers in each posyandu, then establishing Peer Educators (peer group education) or cadres in each RT (Rukun Tetangga). up to several efforts to empower health center health workers to conduct surveys and guidance in every room with toddlers with ARI in the service area of the Asembagus Health Center.

From the phenomenon above, the researcher wants to investigate further about the presence of smokers in the room and its relationship with the incidence of ARI in children under five. The results of this study are expected to provide information about the impact of exposure to cigarette smoke on the health of toddlers. So that parents can change their behavior not to smoke in the room.

MATERIALS AND METHODS

This study is an analytic study whose aim is to determine the relationship of exposure to cigarette smoke in the room to the incidence of ARI in toddlers. In this study, the research design uses a retrospective study, which is an analytical study (survey) concerning how risk factors are studied using a retrospective approach (Notoatmodjo, 2014: 153).

The total population in this study were all patients (total population), namely 30 patients under five with a total number of visits (January - February 2020)

The sampling technique used is the total population with the Accidental Sampling approach. Data analysis uses univariate and bivariate, with the aim of obtaining nominal-ordinal correlations for the x (independent) and y (dependent) variables, linear regression statistical tests are used with the help of SPSS software for windows ve

RESULTS

Table 4.1 Frequency Distribution of Indoor Cigarette Smoke Exposure at Asembagus Health Center, Situbondo Regency in 2020

| No | Exposure to Cigarette Smoke | Amount Respondents | (%) |
|----------|-------------------------------------|--------------------|---------------|
| 1 | Exposure to cigarette smoke is low | 8 | 26,67 |
| 2 | Exposure to cigarette smoke is high | 22 | 73,33 |
| Quantity | | 30 | 100,00 |

Based on table 4.1, it can be seen that the distribution of high frequency and low exposure to indoor cigarette smoke in respondents, namely most (73.33%) have a high level of exposure to cigarette smoke.

Table 4.2 Distribution of ARI incidence in children under five at Asembagus Health Center, Situbondo Regency in 2020

| No | ARI incident | Amount Respondents | (%) |
|----------|--------------|--------------------|---------------|
| 1 | Mild | 7 | 23,33 |
| 2 | Medium | 19 | 63,33 |
| 3 | Heavy | 4 | 13,34 |
| Quantity | | 30 | 100,00 |

Based on table 4.2 above, it can be seen that the distribution of the characteristics of the incidence of ARI experienced and complained of by toddlers is mostly at the moderate level of ARI incidence which can be expressed as a percentage of 63.33% of the total respondents under five. While toddlers who are in severe ARI is 13.34% of the total respondents under five.

Table 4.3 Frequency Distribution of the Relationship of Indoor Cigarette Smoke Exposure to the Incidence of ARI in Toddlers at the Asembagus Health Center, Situbondo Regency in 2020

| No | Cigarette Smoke Exposure | ARI incident | | | | | | Quantity | |
|----------|-------------------------------------|--------------|-------|----------|-------|----------|-------|-----------|---------------|
| | | Mild | | Medium | | Heavy | | Σ | % |
| | | Σ | % | Σ | % | Σ | % | | |
| 1. | Exposure to cigarette smoke is low | 5 | 16,67 | 3 | 10,00 | - | - | 8 | 26,67 |
| 2. | Exposure to cigarette smoke is high | 2 | 6,67 | 16 | 53,33 | 4 | 13,34 | 22 | 73,33 |
| Quantity | | 7 | 23,33 | 19 | 63,33 | 4 | 13,34 | 30 | 100,00 |

Based on table 4.3, it can be seen that the largest distribution lies in the high level of exposure to cigarette smoke in the room with a moderate incidence of ARI, which is 53.33% of all respondents, meaning that the increasing exposure to indoor cigarette smoke will be followed by an increasing risk of disease occurrence. more severe ARI.

Table 4.4 Linear Regression Statistical Test Results Relationship of Indoor Cigarette Smoke Exposure to ARI Incidence in Toddlers at Asembagus Health Center, Situbondo Regency in 2020

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .403 ^a | .162 | .133 | 1.703094 |

Predictors: (Constant), exposure_smoke_cigarettes

Coefficients^a

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|----------------------|-----------------------------|------------|---------------------------|-------|------|
| | B | Std. Error | Beta | | |
| 1 (Constant) | .237 | 1.659 | | .143 | .888 |
| 1 paparan_asap_rokok | .162 | .069 | .403 | 2.330 | .027 |

Dependent Variable: event_ispa

Based on table 4.4 the results of the linear regression statistical test above, the value of r table for an error level of 5% with $n = 30$ obtained 0.162 (there was an increase in the dependent variable based on the independent variable). Because the value of r arithmetic is greater than r table for an error rate of 5% ($0.403 > 0.162$), from this it can be concluded that there is a significant positive relationship of 0.403 between exposure to cigarette smoke in the room and the incidence of ARI in children under five at the Asembagus Health Center in 2020. So if there is an increase in the value of exposure to cigarette smoke in the room, it will also be followed by an increase in the value of the incidence of ARI.

The coefficient of determination is $r^2 = 0.4032 = 0.162$. This means that the value of the incidence of ARI in children under five is 16.2%, it is determined by the results of the exposure to cigarette smoke in the room, through the results of the regression equation. The remaining 83.8% is determined by other factors.

DISCUSSION

1. Variable Cigarette Smoke Exposure In Room

The results of this study indicate that the distribution of high and low exposure to cigarette smoke in the room (73.33%) has a high level of exposure to cigarette smoke.

Based on the results of these data, it can be concluded that most of the toddlers are exposed to cigarette smoke. Even though there are those who only spend a few cigarettes per day for a long period of time, these harmful substances will be stored and accumulated in the body which causes various diseases. Nicotine, tar, cyanide, benzene, ammonia, carbon monoxide, cadmium are harmful substances contained in one cigarette. (Husa-ini, 2006).

This can be caused by several factors including the first is the habit of smoking in the room, the longer someone smokes in the room, the longer someone will be exposed to cigarette smoke. The second thing is that there are more than one smoker in the room, there will be an increase in pollution or harmful substances produced by cigarettes in the room. According to (Ferdiferdi, 2009) Third, a type of cigarette, the higher the tar content in cigarettes, the higher the health risk for passive smokers because of the cigarette smoke produced. Cigarettes contain less than 4000 elements, 200 of which are harmful to health. The main toxins for smokers are tar, nicotine and carbon monoxide. Tar is a hydrocarbon carbon substance that can be sticky and will stick to the lungs. Nicotine is an addictive substance that can affect nerves and blood circulation in the body. This substance can be carcinogenic, and can trigger deadly lung cancer cells. Carbon monoxide is a substance that can bind to hemoglobin levels in the blood, making the blood unable to bind oxygen (Jaya, 2015)

While the fourth factor is the amount of cigarette consumption, the more cigarettes smoked, the more risky smokers get health problems, as well as passive smokers who also inhale the more cigarette smoke produced by smokers. Furthermore, if the more rooms are used for smoking, the higher the possibility of passive smokers to inhale the smoke produced by active smokers. Cigarette smoke is a pollutant for humans who are in a smoking environment. Secondhand smoke is more dangerous than active smokers. Cigarette smoke released by an active smoker and inhaled by passive smokers, will contain five times more carbon monoxide, and four times more tar and nicotine (Wardoyo, 2016). From the opinion above, it can be concluded that an active smoker is the behavior of people who

smoke and immediately smoke cigarettes and can cause danger to their own health and the environment around them.

In the treatment or disposal system of cigarette waste, if there are more and more ashtrays provided in the room, this can make it easier for a smoker to dispose of waste from cigarette butts or ashes, because the more available ashtrays will provoke smokers to smoke indoors, especially if the ashtray is placed on several rooms, and also has an impact on the difficulty of other family members in providing smoking area boundaries. This cigarette waste disposal system also concerns the air ventilation system in the room, the less and smaller the ventilation, the longer the cigarette smoke will disappear.

From these several factors, it can be concluded that, the high level of exposure to indoor cigarette smoke can occur due to the lack of information obtained by families about the dangers of smoking and the lack of facilities that can reduce the volume of pollution from cigarette smoke.

2. Variable incidence of ARI in Toddlers

The results from the respondent table data show that the distribution of the characteristics of the incidence of ARI diseases experienced and complained of by respondents under five, most of them are at the level of incidence of moderate ARI, which is expressed by the percentage of 63.33% of the total respondents in children under five.

This is supported by the analysis submitted by prof. dr. Sugiono, Sp.A, which is one of the diseases that mostly attack children and toddlers in Indonesia is ARI (FKUI, 2004). According to the Household Health Demographic Survey in 2008, 5 per 1000 deaths in children under five were caused by ARI (pneumonia). It can be concluded that this ARI (pneumonia) can cause the death of more than 100,000 toddlers every year or nearly 300 toddlers every day or 1 toddler every 5 minutes (Misnadiarly, 2016).

In addition, according to the opinion conveyed by Levi Silalahi (2014) at the age of toddlers, ARI often occurs this is because the respiratory tract in infants and toddlers is smaller so that the infection is more easily spread. With the presence of a small respiratory tract when smoking cigarette smoke, the cigarette smoke that enters the respiratory tract organs becomes more and then cigarette smoke attached to the respiratory tract organs can disrupt the integrity of the respiratory tract mucosal layer so that it will facilitate the occurrence of ARI. from 5 years a child's body is just starting to form its own antibodies and besides that in infants and toddlers the brain is still weak so that the cough reflex is not strong and foreign objects or germs are easy to enter and not easy to remove, this is what causes babies and toddlers to often suffer from ARI.

3. Relationship between Cigarette Smoke Exposure Indoors Against ISPA Incidences in Toddlers at Asembagus Health Center, Situbondo Regency

From the results of linear regression statistical tests, the value of r table for an error level of 5% with $n = 30$ obtained 0.162 (there was an increase in the dependent variable based on the independent variable). Because the value of r arithmetic is greater than r table for an error rate of 5% ($0.403 > 0.162$), it can be concluded that there is a significant positive relationship of 0.403 between exposure to cigarette smoke and the incidence of ARI in children under five at the Asembagus Health Center in 2020. Where if it occurs an increase in the value of exposure to cigarette smoke, this will also be followed by an increase in the incidence of ARI. The coefficient of determination is $r^2 = 0.4032 = 0.162$. Which means that the value of the incidence of ARI disease in respondents under five is 16.2%, it is determined by the value of exposure to cigarette smoke in a room, through the calculation of the regression equation

This is supported by the results of research which states that the largest distribution lies in the high level of exposure to cigarette smoke with a moderate incidence of ARI of 53.33% of all respondents, meaning that with increasing exposure to indoor cigarette smoke, it will be followed by an increasing risk of ARI incidence. the heavier one.

The magnitude of the effect of cigarette smoke on ARI also depends on the concentration of cigarette smoke collected in a closed room according to the number of smokers, the type of cigarette smoked and the characteristics of the temperature / humidity temperature of the room such as size and ventilation.

Having one or more smokers in one room will increase the risk of family members suffering from illness, for example respiratory problems, which will worsen and experience asthma and aggravate

angina pectoris and ARI, especially in toddlers. The content of cigarette smoke itself is approximately 4000 chemicals of which 200 are toxic and 43 other types can cause the growth of cancer cells for the human body, which initially only 8-20 mg of nicotine contained in cigarettes and after being burned the nicotine enters the blood circulation. humans are only 25% and only takes 15 seconds to get to the human brain.

Acute disturbances from room pollution due to cigarette smoke are unpleasant odors and cause irritation of the eyes, nose, throat, stimulate the recurrence of asthma, lung cancer, respiratory problems, and several diseases for children, such as respiratory infections, and coughs. which produces phlegm or ear inflammatory disease, cigarettes provide pollutants in the form of heavy metals and gases. The gas contained in cigarette smoke in the form of CO, NO₂, formaldehyde is carcinogenic. While the content of heavy metals in the form of cadmium (Ca), arsenic (As), chromium (Cr), tin (Pb), nickel (Ni), and so on are toxic to the body.

CONCLUSION

1. The results showed that the distribution of high and low exposure to cigarette smoke in a room, most respondents (73.33%) had a high level of exposure to cigarette smoke.
2. From the results of data collection respondents show that the distribution of the characteristics of the incidence of ARI disease experienced and complained of by respondents under five, most of them are at the level of incidence of moderate ARI, which is expressed as a percentage of 63.33% of the total respondents under five.
3. From the results of linear regression statistical tests, the value of r arithmetic is greater than r table for an error rate of 5% ($0.403 > 0.162$), it can be concluded that there is a positive relationship between exposure to cigarette smoke and the incidence of ARI in children under five at the Asembagus Health Center in 2020 which significant that is equal to 0.403. Where if there is an increase in the value of exposure to cigarette smoke, it will also be followed by an increase in the incidence of ARI. The coefficient of determination is $r^2 = 0.4032 = 0.162$. This means that the incidence of ARI in under-five respondents is 16.2% which is determined by the value of exposure to cigarette smoke in a room, through the calculation of the regression equation

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