

## THE RELATIONSHIP BETWEEN HOME ENVIRONMENT AND THE INCIDENCE OF ARI DISEASE IN TODDLERS IN THE WORK AREA OF WOLASI COMMUNITY HEALTH CENTER, SOUTH KONAWA REGENCY

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### ABSTRACT

Cases of ARI in the Wolasi Health Center work area experienced an increase in cases from 2020 to 2022, the number of incident rate cases in 2020 was 98 cases (IR 1.7%), in 2021 it was 142 cases (IR 2.5%) and in 2022 it was 297 cases (IR 5.1%). This study was to determine the relationship between the home environment and the incidence of ARI in toddlers in the Wolasi Health Center work area, South Konawe Regency. The type of research conducted was a cross-sectional study design. The population in this study was 287 houses with a sample size of 74 respondents. Data analysis using chi-square test (95%). The results of the study showed that there is a relationship between residential density and the incidence of ISPA in toddlers with a value of  $p = 0.000 < 0.05$  where there are still many houses that have more than one head of household, there is a relationship between the type of house wall and the incidence of ISPA with a value of  $p = 0.019 < 0.05$  where there are still many non-permanent and semi-permanent houses than permanent houses, there is a relationship between ventilation and the incidence of ISPA with a value of  $p = 0.001 < 0.05$ , where many houses have ventilation that does not meet health requirements and there is a relationship between lighting with the incidence of ARI with a  $p$  Value =  $0.016 < 0.05$ , where there are still many houses whose ventilation does not meet health requirements in the Wolasi Health Center work area, South Konawe Regency in 2023. It is hoped that the relevant health services and especially the Wolasi Health Center, will play a greater role in increasing public knowledge through counseling so that public knowledge of matters related to the incidence of ARI increases in order to reduce the number of ARI cases, especially in toddlers.

### INTRODUCTION

Acute respiratory tract infection (ARI) is the leading cause of morbidity due to infectious diseases in the world. Acute respiratory infections are one of the most common diseases that require consultation or treatment in health care facilities, especially in child health services (3,5).

For ARI cases in Indonesia based on data from the 2019 Basic Health Research Report, the incidence rate of ARI cases in toddlers in Indonesia was (12.8%). In 2020, the incidence rate of ARI cases increased to (34.8%). In 2021, the incidence rate of ARI cases decreased compared to the previous year, which was (24.61%) (1,2).

Acute Respiratory Tract Infection (ARI) is a disease that attacks the respiratory organs from the nose to the alveoli and its adnexal organs (sinuses, middle ear cavity, and pleura) caused by more than 300 types of microorganisms such as bacteria, viruses or fungi. ARI is characterized by a brief or sudden occurrence and is very easily transmitted to anyone, especially in vulnerable groups, namely infants, toddlers and the elderly. ARI is one of the 10 most common diseases in health care facilities, ranging from the mildest such as rhinitis to diseases that can cause outbreaks or pandemics, such as influenza and those that cause death, namely pneumonia (4).

ARI in Southeast Sulawesi Province is the most common disease in the list of 10 most common diseases in health centers and hospitals. The incidence of ARI cases in 2019 was 4.3%. In 2020, ARI was in first place out of the top 10 diseases with an incidence rate of 4.4%. In 2021, ARI remained in first place out of the top 10 diseases with an incidence rate of 2.9% (3).

Incident Rate ISPA disease in toddlers for South Konawe Regency in 2020 was 1.2%, in 2021 it was 1.0%, in 2022 it was 1.6% (7).

Cases of ARI in the Wolasi Health Center work area experienced an increase in cases from 2020 to 2022, the number of incident rate cases in 2020 was 98 cases (IR 1.7%), in 2021 it was 142 cases (IR 2.5%) and in 2022 it was 297 cases (IR 5.1%) (8).

Based on an initial survey conducted in the Wolasi Health Center work area, out of 10 children with ARI, there were 8 people whose housing density did not meet the requirements because the area was <8m<sup>2</sup> for 2 (two) people where the way to calculate housing density is the comparison of the floor area of the house (m) with the number of residents of the house, there were 8 (eight) people whose type of house walls did not meet the requirements, namely their houses had semi-permanent and plank walls, there were 7 (seven) people whose ventilation and lighting in their houses did not meet the requirements.

The purpose of this research to know The Relationship Between Home Environment and the Incidence of ISPA in Toddlers in the Wolasi Health Center Work Area, South Konawe Regency.

## METHODOLOGY

Type study This is an observational analytical study with a design *cross sectional study*, where the variables are cause or risk and effect or cases that occur in the research object are measured or collected simultaneously (at the same time). This research design is intended to determine the relationship between the home environment with the occurrence of ISPA in toddlers.

## RESULTS AND DISCUSSION

| No           | Age (Years) | n         | %          |
|--------------|-------------|-----------|------------|
| 1.           | < 20        | 3         | 4.1        |
| 2.           | 21 - 30     | 30        | 40.5       |
| 3.           | 31 - 40     | 37        | 50.0       |
| 4.           | 41 - 50     | 4         | 5.4        |
| <b>Total</b> |             | <b>74</b> | <b>100</b> |

*Data source: Primary data, processed October 2024*

Table 3 shows that the majority of respondents are in the 31-40 year age group, namely 37 respondents (50.0%), while the lowest are in the <20 year age group, namely 3 respondents (4.1%).

| No | Education | n | % |
|----|-----------|---|---|
|----|-----------|---|---|

|              |                    |           |            |
|--------------|--------------------|-----------|------------|
| 1.           | Elementary school  | 2         | 2.7        |
| 2.           | Junior High School | 11        | 14.9       |
| 3.           | High School        | 45        | 60.8       |
| 4.           | D3/S1              | 16        | 21.6       |
| <b>Total</b> |                    | <b>74</b> | <b>100</b> |

*Data source: Primary data, processed October 2024*

Table 4 shows that the majority of respondents were at the high school level of education, namely 45 respondents (60.8%), while the lowest were at the elementary school level of education, namely 2 respondents (2.7%). Table 7 shows that the majority of toddlers are female, namely 45 respondents (60.8%), while the lowest number are male, namely 29 respondents (39.2%).

| No           | ISPA incident           | n         | %          |
|--------------|-------------------------|-----------|------------|
| 1.           | Suffering from ARI      | 47        | 63.5       |
| 2.           | Not Suffering from ISPA | 27        | 36.5       |
| <b>Total</b> |                         | <b>74</b> | <b>100</b> |

*Data source: Primary data, processed October 2024*

Table 8 shows that the majority of toddler experienced ISPA, namely 47 respondents (63.5%), while those who did not experience ISPA were 27 respondents (36.5%).

| No           | Residential Density | n         | %          |
|--------------|---------------------|-----------|------------|
| 1.           | Not eligible        | 39        | 52.7       |
| 2.           | Qualify             | 35        | 47.3       |
| <b>Total</b> |                     | <b>74</b> | <b>100</b> |

*Data source: Primary data, processed October 2024*

Table 9 shows that the majority of respondents have a housing density that does not meet the requirements, namely 39 respondents (52.7%), while those who have a housing density that meets the requirements are 35 respondents (47.3%).

| No           | Types of House Walls | n         | %          |
|--------------|----------------------|-----------|------------|
| 1.           | Not eligible         | 38        | 51.4       |
| 2.           | Qualify              | 36        | 48.6       |
| <b>Total</b> |                      | <b>74</b> | <b>100</b> |

*Data source: Primary data, processed October*

Table 10 shows that most respondents havetype of house wall that does not meet the requirementsnamely 38 respondents (51,4%), while those who met the requirements were 36 respondents (48.6%).

| No           | Ventilation  | n         | %          |
|--------------|--------------|-----------|------------|
| 1.           | Not eligible | 41        | 55.4       |
| 2.           | Qualify      | 33        | 44.6       |
| <b>Total</b> |              | <b>74</b> | <b>100</b> |

Data source: Primary data, processed October 2024

Table 11 shows that the majority of respondents have ventilation that does not meet the requirements, namely 41 respondents (55.4%), while the ventilation that meets the requirements is 33 respondents (44.6%).

| No           | Home lighting | n         | %          |
|--------------|---------------|-----------|------------|
| 1.           | Not eligible  | 41        | 55.4       |
| 2.           | Qualify       | 33        | 44.6       |
| <b>Total</b> |               | <b>74</b> | <b>100</b> |

Data source: Primary data, processed October 2024

Table 12 shows that the majority of respondents have home lighting that does not meet the requirements, namely 41 respondents (55.4%), while those that meet the requirements are 33 respondents (44.6%).

| Residential Density | ISPA incident |      |         |      | Total |      | p Value | phi   |
|---------------------|---------------|------|---------|------|-------|------|---------|-------|
|                     | ISPA          |      | No ISPA |      | n     | %    |         |       |
|                     | n             | %    | n       | %    |       |      |         |       |
| <b>Not eligible</b> | 32            | 68.1 | 7       | 25.9 | 39    | 52.7 | 0,000   | 0.406 |
| <b>Qualify</b>      | 15            | 31.9 | 20      | 74.1 | 35    | 47.3 |         |       |
| <b>Total</b>        | 47            | 100  | 27      | 100  | 74    | 100  |         |       |

Data source: Primary data, processed October 2024

Based on table 13, it shows that of the 39 respondents who have a housing density that does not meet the requirements, there are 32 respondents (68.1%) who experience ISPA and 7 respondents (25.9%) who do not experience ISPA. Meanwhile, of the 35 respondents who have a housing density that meets the requirements, there are 15 respondents (31.9%) who experience ISPA and 20 respondents (74.1%) who do not experience ISPA.

Analysis results using chi square test obtained p Value = 0.000 smaller than  $\alpha = 0.05$  so that the null hypothesis is rejected, thus residential density is significantly related to the incidence of ARI. Furthermore, from the test of the closeness of the relationship, the phi value is obtained = 0.406 which means that there is a moderate relationship between residential density and the incidence of ISPA in toddlers.

| Type House Walls    | ISPA incident |      |         |      | Total |      | p Value | phi   |
|---------------------|---------------|------|---------|------|-------|------|---------|-------|
|                     | ISPA          |      | No ISPA |      | n     | %    |         |       |
|                     | n             | %    | n       | %    |       |      |         |       |
| <b>Not eligible</b> | 29            | 61.7 | 9       | 33.3 | 38    | 51.4 | 0.019   | 0.273 |
| <b>Qualify</b>      | 18            | 38.3 | 18      | 66.7 | 36    | 48.6 |         |       |
| <b>Total</b>        | 47            | 100  | 27      | 100  | 74    | 100  |         |       |

Data source: Primary data, processed October 2024

Based on table 14, it shows that out of 38 respondents who have house wall types that do not meet the requirements, there are 29 respondents (61.7%) who experience ISPA and 9 respondents (33.3%) who do not experience ISPA. Meanwhile, out of 36 respondents who have house wall types that meet the requirements, there are 18 respondents (38.3%) who experience ISPA and 18 respondents (66.7%) who do not experience ISPA.

Analysis results using chi square test obtained p Value = 0.019 smaller than  $\alpha = 0.05$  so that the null hypothesis is rejected, thus the type of house wall is significantly related to the incidence of ARI. Furthermore, from the test of the closeness of the relationship, the phi value is obtained = 0.273 which means that there is a moderate relationship between the type of house wall and the incidence of ARI in toddlers.

Based on the results of the study, it can be concluded that the type of house wall is one of the factors that supports the occurrence of ARI in toddlers in the work area of the Wolasi Health Center, South Konawe Regen.

| Ventilation  | ISPA incident |      |         |      | Total |      | p Value | phi   |
|--------------|---------------|------|---------|------|-------|------|---------|-------|
|              | ISPA          |      | No ISPA |      | n     | %    |         |       |
|              | n             | %    | n       | %    |       |      |         |       |
| Not eligible | 33            | 70.2 | 8       | 29.6 | 41    | 55.4 | 0.001   | 0.393 |
| Qualify      | 14            | 29.8 | 19      | 70.4 | 33    | 44.6 |         |       |
| Total        | 47            | 100  | 27      | 100  | 74    | 100  |         |       |

Data source: Primary data, processed October 2024

Based on table 15, it shows that of the 41 respondents who have inadequate ventilation, there are 33 respondents (70.2%) who experience ARI and 8 respondents (29.6%) who do not experience ARI. Meanwhile, of the 33 respondents who have adequate ventilation, there are 14 respondents (29.8%) who experience ARI and 19 respondents (70.4%) who do not experience ARI.

Analysis results use chi square test obtained p Value = 0.001 smaller than  $\alpha = 0.05$  so that the null hypothesis is rejected, thus ventilation is significantly related to the incidence of ARI. Furthermore, from the test of the closeness of the relationship, the phi value is obtained = 0.393 which means that there is a moderate relationship between ventilation and the incidence of ARI in toddlers. Based on the results of the study, it can be concluded that the area of ventilation is one of the factors that supports the occurrence of ARI in toddlers in the work area of the Wolasi Health Center, South Konawe Regency.

| Lighting     | ISPA incident |      |         |      | Total |      | p Value | phi   |
|--------------|---------------|------|---------|------|-------|------|---------|-------|
|              | ISPA          |      | No ISPA |      | n     | %    |         |       |
|              | n             | %    | n       | %    |       |      |         |       |
| Not eligible | 31            | 66.0 | 10      | 37.0 | 41    | 55.4 | 0.016   | 0.280 |
| Qualify      | 16            | 34.0 | 17      | 63.0 | 33    | 44.6 |         |       |
| Total        | 47            | 100  | 27      | 100  | 74    | 100  |         |       |

Data source: Primary data, processed October 2024

Based on table 16, it shows that of the 41 respondents who have lighting did not meet the requirements, there were 31 respondents (66.0%) who experienced ISPA and 10 respondents (37.0%) who did not experience ISPA. Meanwhile, of the 33 respondents who had lighting fulfilling the requirements, there were 16 respondents (34.0%) who experienced ISPA and 17 respondents (63.0%) who did not experience ISPA.

Analysis results use The chi square test obtained a p value of 0.016 which is smaller than  $\alpha = 0.05$  so that the null hypothesis is rejected, thus lighting is significantly related to the incidence of ISPA. Furthermore, from the test of the closeness of the relationship, the phi value was obtained = 0.280 which means between lighting with the incidence of ARI in children under five has a medium category relationship.

Based on the results of this study, it can be concluded that lighting is one of the factors that supports the occurrence of ARI in toddlers at the Wolasi Health Center, South Konawe Regency

## Discussion

From the results of the study between residential density and the incidence of ARI, namely from 39 respondents whose residential density did not meet the requirements, there were 32 people with ARI (68.1%). While those who did not have ARI were 7 (seven) people (25.9%). Residential density is related to the incidence of ARI, where houses with many occupants will cause a high risk of disease transmission. Houses in the Wolasi Health Center work area, there are many houses with more than 2 families living in them, where the average number of people living in 1 house is

> 6 (six) people. If the residential density is too high, it will cause a lack of oxygen consumption so that the room can become a living medium for acute respiratory infection (ARI) agents. For this reason, it is necessary to pay attention when the size of the room does not meet the requirements, and there is a family member who is sick with ARI, it is better not to sleep in one room, in order to prevent the transmission of the disease and facilitate activities. The condition of a narrow room and too many occupants, even occupied by 2-3 toddlers, will accelerate the transmission of ARI, so that one toddler and another must be separated. For the Wolasi Health Center work area

The housing density is dense but there is no ARI, this is caused by other supporting factors, namely good ventilation and lighting in the house so that the air flow in the house remains cool because the O<sub>2</sub> balance required by the occupants of the house is maintained, apart from that, because of the factor Good nutritional intake for toddlers so that they have good immunity to fight infectious diseases such as ARI.

Of the 35 respondents who had a qualified housing density, there were 15 people with ISPA (31.9%) and 20 people who did not have ISPA (74.1%). The qualified housing density but still experienced ISPA was caused by other factors such as the type of house walls which are not tight, such as boards/wood/bamboo, which causes dust and night wind to enter the house directly, ventilation and lighting factors in the house which do not meet health requirements, apart from that, factors Poor nutritional intake in toddlers, low body weight in toddlers, so their immune system is weak against disease.

From the results of the study between the type of house wall and the incidence of ARI, namely from 38 respondents whose type of house wall did not meet the requirements, there were 29 people with ARI (61.7%). While those who did not have ARI were 9 people (33.3%). House walls that did not meet health requirements (semi-permanent) or walled house No Tight walls such as boards, wood and bamboo can cause ongoing respiratory diseases such as ARI, because the night wind directly enters the house. The type of wall affects the occurrence of ARI, because walls that are difficult to clean will cause dust to accumulate, so that it will be used as a good medium for the growth of germs..

The walls of the house do not meet health requirements (semi-permanent) but the toddler does not have ARI, this is because some of these families, even though the type of wall is only made of wood, are maintained. The walls of the house are painted in bright colors so that the dust that sticks can be seen and can be cleaned immediately. In addition, other supporting factors such as good lighting, ventilation and housing density as well as good nutritional intake for toddlers so that they have good immunity in fighting infectious diseases such as ARI.

Of the 36 respondents who have a type of house wall that meets the requirements (permanent), there are 18 people who have ISPA (38.3%) and 18 people who do not have ISPA (66.7%). The type of house wall that meets health requirements (permanent) but the toddler experiences ISPA because some of the respondent's houses are made of brick walls but look dirty and dusty as if they have never been cleaned. The dirty and dusty condition of the walls can increase the growth of germs. So that it can cause the health of toddlers to decline due to disease. Other factors such as inadequate housing density, poor ventilation, poor nutritional intake for toddlers, and low body weight for toddlers, so that their immune system is weak against disease. From the results of the study between the area of ventilation and the incidence of ARI, namely from 41 respondents whose ventilation did not meet the requirements, there were 33 people with ARI (70.2%) and 8 people who did not have ARI (29.6%). Ventilation did not meet the requirements because from the results of the calculations carried out, the average area of ventilation in the respondent's house was less than 10% of the floor area of his house. Home ventilation that does not meet health requirements causes the air exchange process in the house is not smooth so that the O<sub>2</sub> balance needed by the occupants of the house is not maintained. Lack of ventilation will cause a lack of O<sub>2</sub> in the house which means that the CO<sub>2</sub> levels which are toxic to the occupants will increase. thus making it easy to contract ARI.

House ventilation that does not meet health requirements but the toddler does not have ARI is caused by other supporting factors such as residential density, house walls and good nutritional intake for toddlers so that they have good immunity in fighting infectious diseases such as ARI.

Of the 33 respondents who had adequate ventilation, there were 14 people with ISPA (29.8%) and 19 people without ISPA (70.4%). This was caused by other factors such as poor nutritional intake in toddlers, underweight toddlers so that their immune system was weak against disease, in addition to environmental factors such as housing density, ownership of smoke holes, types of house walls that did not meet health requirements which would affect the health of the residents living in the house.

From the results of the study between lighting and the incidence of ARI, namely from 41 respondents who had lighting did not meet the requirements, there were 31 people with ISPA (66.0%) and 10 people without ISPA (37.0%). Lighting not eligible because the results of the light calculations using a luxmeter obtained an average result of > 60 lux. Lighting Results which does not meet health requirements can cause ARI because inadequate lighting creates a good medium for the growth and development of bacteria, viruses and parasites which can cause health problems, especially respiratory problems.

Lighting that does not meet health requirements but the toddler does not have ARI is caused by other supporting factors, namely residential density, house walls, ventilation and good nutritional intake for toddlers so that they have good immunity in fighting infectious diseases such as ARI.

Of the 33 respondents who have lighting meeting health requirements, there were 16 people with ISPA (34.0%), and 17 people without ISPA (63.0%). Lighting who meet health requirements but whose toddlers have ISPA due to other factors such as housing density in the house that does not meet requirements so that there is a high risk of transmission of ISPA from other family members, poor nutritional intake of toddlers, and low body weight of toddlers.

## CONCLUSION

Based on the research and discussion that has been submitted in this study, it can be concluded that there is a relationship between the home environment and the incidence of ARI in toddlers which has a moderate category relationship.

It is expected that the relevant health services and especially the Wolasi Health Center, will play a greater role in increasing public knowledge through counseling so that public knowledge of matters related to the occurrence of ARI increases in order to reduce the number of ARI cases, especially in toddlers.

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