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The Relationship Between House Conditions and the Incidence of Ari in Toddlers in Durian Village, Working Area of UPTD Public Health Center of Lubuk Rukam, OKU District Year 2025

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Abstract*—Acute Respiratory Infections (ARI) remain a major health problem among toddlers. Housing conditions are suspected to play an important role in the incidence of ARI. This study aims to analyze the relationship between housing conditions (ventilation, lighting, humidity, and occupancy density) and the incidence of ARI among toddlers in Durian Village, Working Area of UPTD Puskesmas Lubuk Rukam, OKU Regency. This study used a cross-sectional design with a sample of 128 parents who have toddlers in the Working Area of UPTD Puskesmas Lubuk Rukam, OKU Regency. Data were collected through questionnaires covering variables of ARI incidence, house ventilation, lighting, humidity, and occupancy density. Data analysis used the Chi-Square statistical test to determine the relationship between variables. The prevalence of ARI among toddlers was 54.7%. A total of 54.7% of houses had inadequate ventilation, 44.5% had inadequate lighting, 53.9% had unhealthy humidity levels, and 54.7% were classified as having high occupancy density. According to bivariate analysis, there was a strong correlation between the incidence of ARI and ventilation (p-value = 0.000), humidity (p-value = 0.000), lighting (p-value = 0.000), and occupancy density (p-value = 0.000). All toddlers (100%) living in houses with adequate conditions for each variable experienced ARI. Housing conditions that do not meet health standards, including ventilation, lighting, humidity, and occupancy density, have a highly significant relationship with the incidence of ARI among toddlers in Durian Village. Improving housing quality is essential for ARI prevention efforts*.

***Keywords*—** *ARI, Toddlers, Housing Conditions, Ventilation, Lighting, Humidity, Occupancy Density*.

I. INTRODUCTION

ARI in toddlers is an acute respiratory infection that often occurs in children under five years of age. This condition is caused by a viral or bacterial infection of the respiratory tract, from the nose to the lungs. ARI in toddlers requires attention because their immune systems are not as strong as those of adults, making them more susceptible to infection. (Muhammad Ikhsan Akbar et al., 2024) .

ARIs are caused by a variety of pathogens, including viruses, bacteria, fungi, and other microorganisms. More than 300 types of viruses, bacteria, and fungi are known to cause ARIs. Examples of bacteria that can cause ARIs include *Streptococcus haemolyticus* , *Haemophilus influenzae* , and *Streptococcus pneumoniae.* (Indah et al., 2023) . Transmission of pathogens that cause ARI can occur through three main routes: contact (direct and indirect), droplets (fluids from the respiratory tract), and aerosols expelled by infected individuals. The specific mode of transmission will vary depending on the type of pathogen. (Garbern et al., 2022).

ISPA Health Profile for South Sumatra Province in 2022: 16.06% of cases of ISPA disease, In 2023 the number of cases of ISPA disease was 22.21% and in 2024 the number of cases of ISPA disease was 26.62% (South Sumatra Provincial Health Office, 2025) . Meanwhile, in Ogan Komering Ulu Regency, ISPA disease data In 2022, the number of cases was 2.54%, and in 2023, the number of ISPA cases increased by 23.60%. In 2024, the number of ISPA cases was 16.74% (OKU District Health Office, 2025) .

Based on data from the UPTD of the Lubuk Rukam Health Center, Peninjauan District, OKU Regency, the ISPA data in 2022 was 186 (22.66 %) cases and in 2023 it was 224 cases (2.19%). In 2024, ISPA was the third most common disease in the UPTD of the Lubuk Rukam Health Center, Peninjauan District, OKU Regency, with 389 (35.60 %). From January to April 2025, 50 ISPA toddler patients were recorded for treatment at the UPTD of the Lubuk Rukam Health Center, Peninjauan District, OKU Regency (UPTD of the Lubuk Rukam Health Center, 2025) .

Based on the description of the data above, the researcher is interested in researching " The Relationship Between Home Conditions and the Incidence of ARI in Toddlers in Durian Village, Work Area of the UPTD Lubuk Rukam Health Center, OKU Regency in 2019." 2025".

II. RESEARCH METHODS

The research design used in this study is quantitative with approach using cross sectional Darussalam et al., (2019) . In this study, the sample used the Total Sampling technique, namely all toddlers in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency, totaling 128 respondents (Total Sampling). Analysis data Which used in the research is a *chi square* test at a 95% confidence level.

III. RESEARCH RESULT

1. Distribution of ISPA Incidence in Toddlers

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TABLE 1. Distribution of ISPA Incidence in Toddlers

No	ISPA incident	Frequency (n)	Percentage (%)
1	ARI	70	54.7
2	No ARI	58	45.3
	Total	**128**	**100.0**

Based on Table 1 Distribution of Frequency of ISPA Incidence in Toddlers in Durian Village, the results obtained from 128 toddlers studied were that 70 toddlers (54.7%) experienced ISPA, while 58 toddlers (45.3%) did not experience ISPA.

2. Distribution of House Ventilation Conditions

TABLE 2. Distribution of House Ventilation Conditions

No	Ventilation	Frequency (n)	Percentage (%)
1	Not eligible	69	53.9
2	Qualify	59	46.1
	Total	**128**	**100.0**

Based on Table 2 Distribution of House Ventilation Frequency in Durian Village, the results show that most houses, 53.9%, have ventilation that does not meet the requirements, while 46.1% meet the requirements.

3. Home Lighting Distribution

TABLE 3. Home Lighting Distribution

No	Lighting	Frequency (n)	Percentage (%)
1	Not eligible	66	51.6
2	Qualify	62	48.4
	Total	**128**	**100.0**

Based on Table 3, the distribution of lighting frequency in houses in Durian Village shows that 48.4% of houses have lighting that meets the requirements, while 51.6% do not meet the requirements.

4. Home Humidity Distribution

TABLE 4. Home Humidity Distribution

No	Humidity	Frequency (n)	Percentage (%)
1	Not healthy	68	53.1
2	Healthy	60	46.9
	Total	**128**	**100.0**

Based on Table 4, Distribution of Frequency of Humidity in Houses in Durian Village The results obtained were that most of the houses, 53.1%, had unhealthy humidity, while 46.9% had healthy humidity.

5. Distribution of Residential Density

TABLE 5. Distribution of Residential Density

No	Residential Density	Frequency (n)	Percentage (%)
1	Congested	73	57.0
2	Not Solid	55	43.0
	Total	**128**	**100.0**

Based on Table 5, the frequency distribution of residential density in Durian Village shows that 57% of houses are classified as densely populated, while 43% are not densely populated.

6. The Relationship Between Home Ventilation and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

TABLE 6. The Relationship Between Home Ventilation and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

No	Ventilation	ARI		Total	*p-value*
		Yes	No		
1	Not eligible	60 (87.0 %)	9 (13.0 %)	69 (100%)	0,000
2	Qualify	10 (16.9 %)	49 (83.1 %)	59 (100%)	
Total		70	**58**	**128**	

Based on Table 6, the Relationship between Home Ventilation and the Incidence of ISPA in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency, the results of the study showed that the proportion of respondents whose Home Ventilation did not meet the requirements who suffered from ISPA was 87 %, which was greater than the proportion of respondents whose Home Ventilation met the requirements who suffered from ISPA, which was 16.9%. The p-value is 0.000, ($p < 0.05$), there is a significant relationship between home ventilation and the incidence of ARI.

7. The Relationship Between Home Lighting and the Incidence of ISPA in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

TABLE 7. The Relationship Between Home Lighting and the Incidence of ISPA in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

No	Home Lighting	ARI		Total	*p-value*
		Yes	No		
1	Not eligible	57 (86.4 %)	9 (13.6 %)	66 (100%)	0,000
2	Qualify	13 (21.0 %)	49 (79.0 %)	62 (100%)	
Total		**70**	**58**	**128**	

Based on Table 7, the results of the proportion of respondents whose home lighting does not meet the requirements for suffering from ISPA are 86.4 %, which is greater than the proportion of respondents whose home lighting meets the requirements who suffer from ISPA by 21.0%. The p-value is 0.000 ($p < 0.05$), there is a significant relationship between home lighting and the incidence of ISPA. Most toddlers between Home Lighting and the incidence of ISPA.

8. The Relationship Between House Humidity and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

TABLE 8. The Relationship Between House Humidity and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

No	Home Humidity	ARI		Total	*p-value*
		Yes	No		
1	Not healthy	58 (85.3 %)	10 (14.7 %)	68 (100%)	0,000
2	Healthy	12 (20.0 %)	48 (80.0 %)	60 (100%)	
Total		**70**	**58**	**128**	

Based on Table 8, the results of the study show that the proportion of unhealthy respondents' home humidity and those suffering from ARI is 85.3%, which is greater than the proportion of healthy respondents' home humidity and those

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suffering from ARI, which is 20%. The p-value is 0.000 (p <0.05), which means there is a significant relationship between home humidity and the incidence of ARI.

9. The Relationship Between Residential Density and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

TABLE 9. The Relationship Between Residential Density and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

No	Residential Density	ARI		Total	*p-value*
		Yes	No		
1	Congested	61 (83.6 %)	12 (16.4 %)	73 (100 .0 %)	0,000
2	Not Solid	9 (16.4 %)	46 (83.6 %)	55 (100 .0 %)	
Total		**70**	**58**	**128**	

Based on Table 9, the research results show that the proportion of respondents' housing that is densely populated and suffering from ISPA is 83.6%, which is greater than the proportion of respondents' housing that is not densely populated and suffering from ISPA, which is 16.4%. With a p-value of 0.000 (p < 0.05), there is a very significant relationship between housing density and the incidence of ISPA.

IV. DISCUSSION

1. The Relationship Between Home Ventilation and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

The results of the study showed that the proportion of respondents whose home ventilation did not meet the requirements who suffered from ISPA was 87 %, which was greater than the proportion of respondents whose home ventilation met the requirements who suffered from ISPA, which was 16.9%. The p-value is 0.000, (p < 0.05), there is a significant relationship between home ventilation and the incidence of ARI in Durian Village, the working area of the UPTD Lubuk Rukam Health Center, OKU Regency.

The results of this study are also the same as the journal's conclusions. Arif and Andara, (2025) entitled Factors Related to the Incidence of ISPA in the Sumarorong Community Health Center Work Area, Sumarorong District, Mamasa Regency, which states that *the p-value results are* 0.00 1 < 0.05, meaning that ventilation has a significant relationship with the incidence of ISPA. This is also supported by research conducted by Nurhayati *et al.*, (2025) in the Journal of Health Research which states that there is a relationship significant effect of ventilation on the incidence of ISPA. Strengthened by research Irma *et al.* , (2024) title Physical Condition of the House as a Determinant of Upper Respiratory Tract Infections (ISPA) in Toddlers *p-value* 0.000 < 0.05 h the results of the study stated that there is a Relationship Between Ventilation and the occurrence of ISPA.

Poor home ventilation leads to suboptimal air circulation, which triggers the buildup of pollutants and germs indoors (Tanti, W. & Ningsih, EW, 2023). Increasing the rate of air exchange in the home significantly reduces the risk of acute respiratory illness in children. Therefore, ensuring adequate airflow inside the home is crucial for maintaining air quality and preventing the spread of pathogens. (Kim, SY, Lee, JW & Park, HJ, 2024) . Poor ventilation can allow bacteria to enter and grow indoors, potentially infecting toddlers living there. Home ventilation plays a crucial role in maintaining optimal humidity and improving air quality (Fakarina et al., 2023) . Ventilation also helps rid the air of bacteria, especially pathogens. There are two types of ventilation: natural ventilation and artificial ventilation. Natural ventilation occurs when air flows naturally through windows, vents, or holes in walls, among other things. Artificial ventilation uses specialized tools to circulate air, such as fans and air conditioners (Ridha & Mokodompis, 2025) .

2. The Relationship Between Home Lighting and the Incidence of ISPA in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

From the results of the study, the proportion of respondents whose home lighting did not meet the requirements suffered from ISPA, namely 86.4 %, greater than the proportion of respondents whose home lighting met the requirements who suffered from ISPA by 21.0%. The p-value was 0.000 (p <0.05), There is a significant relationship between home lighting and the incidence of ISPA. Most toddlers between Home Lighting and the Incidence of ISPA in Durian Village, Working Area of UPTD Lubuk Rukam Health Center, OKU Regency.

The results of this study are in line with research conducted by Aria Gusti, Wira Iqbal and Fitrahul Afifah, (2025) which shows that there is a significant relationship between home lighting and the incidence of ARI with *p-value* 0.009 . The results of this study are also the same as the conclusions of Sarwoko's research , (2021) *p-value* 0.000 entitled The Relationship between Residential Density, Ventilation, and Lighting with the Incidence of ISPA in Toddlers in Talang Jawa Village, Working Area of UPTD Tanjung Agung Health Center, West Baturaja District, Ogan Komering Ulu Regency in 2020 stated that there was a significant relationship between home lighting and the incidence of ISPA. Strengthened by research Falah *et al.*, (2023) The title of the Physical Environment of the Homes of Acute Respiratory Infection (ARI) Sufferers in Tasikmalaya City , the results of the study stated that there is a significant relationship between home lighting and the incidence of ARI .

Natural lighting from sunlight has a bactericidal effect, which can kill disease-causing microorganisms. This is in accordance with the book *Healthy Homes, Healthy Lives* , which explains that exposure to UV rays from the sun can reduce the number of germs in the air and on surfaces (Chen, 2024) . Adequate natural lighting is associated with a decrease in the incidence of ARI in toddlers (Wulandari, E., Sari, DA & Fitri, R., 2023) . Adequate home lighting is important to reduce the risk of ARI because sunlight can kill bacteria and reduce room humidity, but studies show varying results , some showing a strong relationship and others showing no effect, because other factors such as poor ventilation, the habit of

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opening windows, residential density, and cigarette smoke also have a significant influence on the incidence of ARI (R. Hartono & Rahmawati, 2021) .

3. The Relationship Between House Humidity and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

From the results of the study, the proportion of Humidity in the Houses of unhealthy respondents and those suffering from ISPA was 85.3%, which was greater than the proportion of Humidity in the Houses of healthy respondents and those suffering from ISPA by 20%. The p-value was 0.000 (p <0.05), which means that there is a significant relationship between Humidity in the Houses and the incidence of ISPA in Durian Village, the working area of the UPTD Lubuk Rukam Health Center, OKU Regency.

The results of this study are in line with research Falah *et al.* , (2023) titled The Physical Environment of Homes of Acute Respiratory Infection (ARI) Sufferers in Tasikmalaya City. The research results show a significant relationship between home humidity and the incidence of ARI. This research result is also the same as Sabila, Amin and Hasnur, (2023) journal entitled The Relationship Between the Physical Environment of the House and the Incidence of Acute Respiratory Tract Infections (ARI) in Toddlers in the Peusangan Community Health Center Work Area in 2023. which states that there is a significant relationship between home humidity and the incidence of ARI. Strengthened by Aristatia, (2021) with the title Analysis of Factors Related to the Incidence of Acute Respiratory Tract Infections (ARI) in Toddlers at the Panjang Community Health Center, Bandar Lampung City in 2021 which states that there is a significant relationship between home humidity and the incidence of ARI.

An excessively humid environment can be an ideal breeding ground for mold, mites, and bacteria. High indoor humidity is strongly correlated with increased cases of asthma and acute respiratory infections (Johnson, A., Davis, R. & Wilson, 2024) . Mold and mites that thrive in humid environments can be allergens that trigger inflammatory responses in the respiratory tract, which emphasizes the importance of maintaining home humidity within the ideal range to prevent respiratory health problems (Setyaningsih, N., 2023) . High humidity in the home can contribute to acute respiratory infections (ARI) because a humid environment favors the growth of bacteria, fungi, and mites that can trigger and exacerbate ARI. The ideal humidity level for the home is around 40-60%. To prevent humidity-related ARI, maintain good ventilation by opening windows regularly, avoid keeping wet clothes or items indoors, and ensure the home is free from dampness. (R. Hartono & Rahmawati, 2021) .

4. The Relationship Between Residential Density and the Incidence of ARI in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency

The results of this study show that the proportion of densely populated residential respondents suffering from ISPA is 83.6%, which is greater than the non-dense residential respondents suffering from ISPA by 16.4%. With a p-value of 0.000 (p <0.05), there is a very significant relationship between residential density and ISPA incidence in Durian Village, the working area of the UPTD Lubuk Rukam Health Center, OKU Regency.

The results of this study are in line with research Dongky and Kadrianti, (2023) titled Risk Factors of the Physical Environment of Homes with the Incident of 1 SPA in Toddlers in Takatidung Village, Polewali Mandar , the results of the study showed that residential density in the house contributed to the incident of ISPA in toddlers. The results of this study are also the same as Tony Setiawan Asfa, Suhadi and Jusniar Rusli Afa, (2025) journal entitled Factors Related to the Incidence of Acute Respiratory Tract Infection (ISPA) in Toddlers in Lahontohe Village, Tongkuno Health Center Working Area, Muna Regency, which states that there is a relationship between room occupancy density and the incidence of ISPA in toddlers. Strengthened by Sabila, Amin and Hasnur, (2023) with the title Factors Related to the Incidence of Acute Respiratory Tract Infection (ISPA) in Toddlers in Lahontohe Village, Tongkuno Health Center Working Area, Muna Regency p-value 0.004 which states the results There is a relationship between room occupancy density and the incidence of ISPA and Sarwoko's research, (2021) which states that there is a significant relationship between residential density and the incidence of ISPA in children under five with a p-value of 0.000 .

Inappropriate housing density, where too many people are in one room or bedroom, increases the risk of Acute Respiratory Infections (ARI) because it facilitates the transmission of viruses and bacteria through the air and creates a humid and polluted environment. High density reduces air exchange, increases humidity due to water vapor from respiration, and prolongs contact between occupants, all of which contribute to increased transmission of ARI, especially in infants. (Susilawaty et al., 2020). High residential density facilitates the transmission of pathogens from one individual to another. The risk of transmission increases with closer physical contact and less room for movement. A WHO report (2024) titled *Indoor Air Quality and Health* highlights that residential density is a major risk factor for the spread of infectious diseases, including acute respiratory infections (ARI) (World Health Organization (WHO), 2024) . Excessive residential density leads to faster and more widespread transmission of respiratory diseases, especially among children (Suryani, D. & Lestari, R., 2023).

V. Conclusion And Suggestions

Based on the results of research conducted in Durian Village, Lubuk Rukam Health Center Work Area, OKU Regency, the following conclusions can be drawn:

1. There is a Relationship Between Home Ventilation and the Incidence of ISPA in Durian Village, Working Area of UPTD Lubuk Rukam Health Center, OKU Regency in 2025 with a *p-value of* 0.000.
2. There is a Relationship Between Home Lighting and the Incidence of ISPA in Durian Village, Working Area of UPTD Lubuk Rukam Health Center, OKU Regency in 2025 with a *p-value of* 0.000.

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3. There is a Relationship Between House Humidity and the Incidence of ISPA in Durian Village, Working Area of UPTD Lubuk Rukam Health Center, OKU Regency in 2025 with a *p-value of* 0.000.
4. There is a Relationship Between Residential Density and the Incidence of ISPA in Durian Village, the Working Area of the UPTD Lubuk Rukam Health Center, OKU Regency in 2025 with a *p-value of* 0.000.

Based on the conclusions above, the researcher makes several suggestions as follows:

1. should be conducted to the community about ventilation and the incidence of ISPA. Conduct home visits to provide direct education to the community about improving home conditions. Reinforce environmental intervention strategies to lower the prevalence of ISPA in young children.
2. Raise awareness to ensure windows are opened regularly for good air circulation so that sunlight can enter and kill bacteria, as well as paying attention to house cleanliness and maintaining ventilation so that there is no dust that can become a breeding ground for germs.
3. Get into the habit of cleaning mold and dust and using an air purifier. Reduce the number of occupants per room and ensure adequate space. Get into the habit of cleaning mold and dust and using an air purifier.
4. Reduce the number of occupants per room and ensure adequate room space.

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