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Literature Study Relationship Between Physical Condition of The House and Occupancy Density With The Incidence of ISPA Disease In Toddlers

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Abstract: Acute Respiratory Tract Infection can be defined as a respiratory tract disease caused by infectious agents that can be transmitted from human to human. The infectious agents in question are viruses, bacteria, and other factors such as the environment and the host. Acute Respiratory Tract Infection is influenced or caused by three things, namely the presence of germs, the state of endurance, the state of the environment, and air quality. The design of this research is Literature Review or literature review. Literature review study is a method used to reveal data and sources related to a particular topic that can be obtained from various journal sources, and data from the Samarinda City Health Office which are accessed online.

Keywords: Acute Respiratory Tract Infection, Environment, Infectious Agent

1. Introduction

The World Health Organization explains that deaths of children under five are caused by Acute Respiratory Tract Infection, which is one of the world's health problems. 15,000 children under five die every day. In 2017 the total number of child deaths in children under five reached 5.4 million. ISPA accounts for 16% of all deaths of children under the age of 5 years in the world, amounting to 920,136 under-fives dying or more than 2,500 under-fives per day (Suryananda, 2019). The Child Health and Nutrition Research Initiative has identified key factors for the development of severe and fatal pneumonia as research priorities, especially in low- and middle-income countries. In Central America, ISPA is the fourth leading cause of death among people of all ages. Efforts to reduce the burden of ARI must address strategies to prevent infections from occurring and to prevent deaths among infected patients (Tomczyk et al., 2019).

Acute Respiratory Tract Infection can be defined as a respiratory tract disease caused by infectious agents that can be transmitted from human to human (Tria Wijayanti, 2018). The infectious agents are viruses, bacteria, and other factors such as the environment and the host (Tri R. Pujiani, 2017). Acute Respiratory Tract Infection is influenced or caused by three things, namely the presence of germs, the state of endurance, environmental conditions, and air quality (Sihombing, 2018). Things that must be considered to realize a healthy home are physical, chemical, and biological conditions inside or outside the home environment. Based on the Decree

(Ministry of Health of the Republic of Indonesia No.829/Menkes/SK/VII, 1999) on physical housing health requirements including lighting, air quality and home ventilation.

In the results (Riskasdas, 2018) listed on the prevalence of doctors, by people with ISPA disease is 6%, and from the same data shows that people with Acute Respiratory Tract Infection diagnosed by doctors and showing symptoms are 10% of people with ISPA who have regular check-ups (Aziz, 2019).

The physical environment of the house is one of the risk factors associated with the incidence of Acute Respiratory Tract Infection. Houses generally have floors, walls, occupancy density, while houses with semi-permanent and non-permanent types most of the physical conditions of the house still do not meet health requirements. The results of the analysis in this study using the odds ratio (OR) statistically significant 95% obtained an OR value = 2.030 which means that houses with dense occupants have a risk of 2.030 times to suffer from ISPA in toddlers compared to residents whose homes are not dense (Wulandhani, 2019).

Factors that affect health status are the environment, behavior, health services and heredity, in this study revealing a risk factor studied by looking back with a case control approach, based on the results of the study showed that the density of occupancy with the incidence of Acute Respiratory Tract Infection in unqualified toddlers in the case group was a greater proportion of 71.4% compared to the control group of 14.3%, while for the density of residents who met the requirements in the control group the proportion was greater 85.7% compared to the case group of 28.6%. And looking at the statistical results shows a P-value of 0.000, thus the P-value is smaller than α : 0.05, so it is stated that there is a significant relationship between occupant density and the incidence of ISPA in toddlers (Raenti et al., 2019).

Densely populated houses cause air circulation in the house to be unhealthy, because with many residents it can affect oxygen levels in the house. So that it causes an increase in the number of microorganisms that cause diseases, especially those transmitted through the respiratory tract so that the range for families and children under five (Siwiendrayanti, 2017).

From the results of the study, it is known that the cause of the occupancy density of toddler rooms in East Kalianget Village 94.5% does not meet the requirements and those that meet the requirements are 20.0% in accordance with Kepmenkes RI 829/1999 because the majority in 1 house there are several families and in a bedroom inhabited by one family which includes father, mother and children (Agungnisa, 2019). Based on the above background, the authors are interested in discussing "The relationship between occupancy density and the incidence of acute respiratory tract infection in toddlers".

Samarinda City Health Office (DHO, 2017) data on the prevalence of ISPA disease in Samarinda City in 2017 was 3,456 cases, acute respiratory tract infection disease in Samarinda City is the tenth highest disease suffered by the people of Samarinda City (Vera Triandriani, 2019). Samarinda City has 21 health centers including the Loa Bakung Health Center with an area of 14.45 Km with a population density of 1,804 Km. With a total of 4010 toddlers. Data obtained on ISPA cases from 2017, 2018 to 2019 experienced a specific decrease. However, acute respiratory tract infection is still the first of ten diseases that often occur in the community and the Loa Bakung

Health Center Working Area. Based on available data from Loa Bakung Health Center, ISPA cases in 2017 amounted to 5,502 people, and in 2018 amounted to 4,203 people. While in 2019 the total prevalence of acute respiratory tract infection cases was 3,231 people in the last two years from January to December. Based on existing data, the decrease in ISPA prevalence from 2017 to 2019 was 30%.

Based on monthly data on acute respiratory tract infection in 2019 in November and December, there were 187 cases of ISPA in toddlers at the Loa Bakung Health Center, the highest case of ISPA in the Pal Besi area of RT 52. So the researcher is interested in conducting research on "The relationship between the physical condition of the house and the density of occupancy with the incidence of acute respiratory tract infection in toddlers in the Loa Bakung Health Center Working Area".

2. Materials and Methods

2.1 Study Design

The design of this research is Literature Review or literature review. A literature review study is a method used to reveal data and sources related to a particular topic that can be obtained from various journal sources, and data from the Samarinda City Health Office which are accessed online.

2.2 Inclusion and Exclusion Criteria

2.2.1 Study Type

This research design taken in this study is Cross Sectional analytic, cross control, descriptive, Observational and other research designs and is not included in the review of research that has been researched.

2.2.2 Type of Intervention

The main intervention that has been examined in this paper is the relationship between residential density and the incidence of acute respiratory tract infection in toddlers.

2.2.3 Measurement Result

The outcome measured in this scientific search is the relationship between residential density using data on the coverage of healthy homes and research results from international and national journals while the incidence of acute respiratory tract infection uses city or provincial health department data on toddlers.

2.2.4 Literature Search Strategy

Search for relevant published articles on Google Scholar, Directory of open access journals, PubMed and Microsoft academic search using the selected keywords, namely: Physical condition of the house, Residential Density and Acute Respiratory Tract Infection. Articles or journals that fit the inclusion and exclusion criteria were taken for further analysis. This literature review uses literature published in 2015-2020 that can be accessed in full text and pdf format and scholarly (peer reviewed journals). The criteria for the journals reviewed were Indonesian and English research journals.

2.2.5 Data Synthesis

This literature review was synthesized using the narrative method by grouping similar extracted data according to the results measured to answer the objectives. Research journals that meet the inclusion criteria are then collected and a summary of the journal is made including the name of the researcher, the year the journal was published, the country of research, the title of the research method and a summary of the results or findings. The summary of the research journal was entered into a table sorted alphabetically and the year of publication of the journal and in accordance with the format above.

To further clarify the analysis, the abstract and full text of the journal were read and examined. The summary of the journal was then analyzed against the content contained in the research objectives and research results. The analysis used journal analysis, then coding the contents of the journals reviewed using the occupancy density category. The collected data were then searched for similarities and differences and discussed to draw conclusions.

2.2.6 Journal Search

Based on the results of searches on Google Scholar, Directory of open access journals, PubMed and Microsoft academic search with keywords physical condition of the house, occupancy density and Acute Respiratory Tract Infection. Journals included in the inclusion and exclusion criteria include:

1) Journal Inclusion Criteria

- a) Journal published 5 years (2015-2020)
- b) Keywords Physical environment of the house, occupancy density, and ISPA in children under 5 years of age
- c) International journals and national journals
- d) Relevant and accurate journals

2) Journal Exclusion Criteria

- a) Does not meet the requirements for journals published in 5 years
- b) Not included in journals for toddlers aged >5 years
- c) Not included in the keywords Physical environment of the house, occupancy density and ISPA
- d) Journal is not relevant and accurate

3. Results and Discussion

3.1 Literature Review Results

Table 1. Literature Review Results

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
(Hidayah et al., 2017)	Household environment factors associated with Acute Respiratory infection among under-five children	2017	The purpose of this study was to determine the relationship between the home environment and the incidence of Acute Respiratory Tract Infection in Pudi Village, North Kelumpang District, Kotabaru Regency.	cross sectional analitik	90 houses and children under five in Pudi Village	The results of the analysis in this study found that 60 respondents who lived in houses with unqualified occupancy, there were (58.3%) who suffered from ISPA and 30 respondents lived in houses that met the requirements, there were (100%) who did not have ISPA with P-value = 0.000 ($\alpha = 0.05$) proving the existence of a relationship between residential density or residence with the incidence of ISPA.
(Triana & Purwana, 2019)	Factors affecting the incidence of acute respiratory Tract infection in children under five at betungan Community health center, Bengkulu	2019	Aims to determine the factors influencing the incidence of acute respiratory infections in children at Puskesmas Betungan, Bengkulu.	Cross sectional	109 children under five were selected for this study by accidental sampling.	Inadequate housing density increased the risk of ISPA in children under five years greater than those who met the requirements (OR = 0.26; 95% CI = 0.114 to 0.584; p = 0.002) and was statistically significant.

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
(Ramdan et al., 2018)	Risk Factor of Pnemonia among Children Aged Under 5 Years. A Case Control Study in Samarinda, Indonesia	2018	To identify factors associated with the incidence of pneumonia in children under 5 years of age.	Cross control	21 case samples and 21 control samples were taken randomly	Residential density in the case group was mostly unqualified (80.9%), while the control group was mostly qualified (52.4%). The study concluded that respiratory infections such as pneumonia will increase in homes with more than 7 occupants with an increase of 1.83 times for every 1 person increase. The risk of pneumonia increases by 1.15 times when children under five years old sleep with more than 3 people in one room, and an increase of 2.87 times when living in a high-density house.
Ulwia	Study of residential environmental factors of Acute Respiratory Tract Infection sufferers in toddlers in the working area of the Iha Health Center,	2017	Knowing the description of occupancy density, floor type and house ventilation with the incidence of Acute Respiratory Tract Infection disease in toddlers.	Descriptiv e with Univariat e Analysis	33 with a sampling technique that is saturated sampling	showed that patients with ISPA in toddlers had the highest condition of unqualified house occupancy density as many as 25 (76%) while the lowest had a qualified occupancy density of 8 (24%). chi square analysis obtained a value of $p = 0.005$ ($p < \alpha$) influenced by lack of knowledge about

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
(Ardhana Putri & Sukandi, 2018)	Huamual sub-district, Seram Bagaian Barat Regency. The Relationship between Residential Density and the Incidence of Sickness in Children Under Five (1 - 5 Years) in Sesela Village, West Lombok West Nusa Tenggara	2018	To see whether there is a relationship between residential density and the incidence of Acute Respiratory Tract Infection in children under five in Sesela Village, West Lombok.	Cross sectional	The sampling technique chosen was random sampling so that the sample in this study amounted to 89 children.	healthy housing and limited economic factors. showed that of the 66 children under five (74%) who had a residential density that met the requirements, 40% of all children under five suffered from ISPA and 34% did not suffer from ISPA. The remaining 23 toddlers (26%) have a residential density that does not meet the requirements where 16% suffer from ISPA and 10% do not suffer from ISPA. From the results of the analysis with the Pearson Chi Square Test obtained $p \text{ value} = 0.599 > 0.10$ which means H_0 is accepted and H_a is rejected. It can be concluded that there is no significant relationship between residential density and the incidence of ISPA in children under five.
(Kursani et al., 2019)	The Relationship between	2019	to determine the relationship between the	Cross Sectional	the research sample	80 respondents whose residential density did not meet the standards,

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
	Physical Conditions of the House and Human Factors with the Incidence of ISPA in Toddlers in the Garuda Health Center Working Area, Tangkerang Pekanbaru 2019		physical condition of the house and human factors with the incidence of ISPA in toddlers in the Garuda Health Center Working Area, Tangkerang Tengah Village Pekanbaru in 2019		was 100 respondents with the sampling technique Stratified Random Sampling.	71 people (88.8%) of them experienced ISPA and 9 people (11.3%) did not experience ISPA, while from 20 respondents who had residential density that met the standards, 11 people (55.0%) of them experienced ARI and 9 people (45.0%) did not experience ISPA. The chi-square results obtained P-value = 0.001 is smaller than alpha = 0.05, Analysis of the closeness of the relationship between the two variables obtained a value (POR) = 6.455 (2.104-19.805) means there is a significant relationship.
(Agungnisa, 2019)	Home Physical Sanitation Factors Affecting the Incidence of ISPA in Toddlers in Kalianget Timur Village	2019	Analyze the physical factors of the house that can be questioned on the incidence of ARI among toddlers in Kalianget Timur Village.	Cross Sectional	The study sample amounted to 60 toddlers	Occupancy density does not meet the requirements (94.6%) and meet the requirements (20.0%) with the incidence of Acute Respiratory Tract Infection and meet the requirements, Chi-square test P = 0.000 means that if there is a significant relationship between occupancy of toddler rooms with the incidence of ISPA in

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
(Jabeen et al., 2017)	Estimated Proportion And Factors Associated With Acute Respiratory Infections In Children Under Five In Islamabad Pakistan	2017	To determine the prevalence of current patterns and potential risk factors of ARI in children under five years of age receiving Healthcare facilities from the Federal Government Polyclinic Dispensary in G-7/3-4, Islamic century.	Cross Sectional	All children from 0-59 months, 104 children participated.	toddlers in Kalianget Timur Village. In this study, Acute Respiratory Tract Infection was found to be statistically significant with (living in claustrophobic conditions) the number of members 5-6 people 46 (44.2%) with a P-Value of 0.007.
(Ratnaningsih & Lusiana, 2020)	Relationship Between Cleanliness of the Home Environment With Incidence of Acute Respiratory Infections among Children Under Five Years	2020	To identify the cleanliness of the home environment, as well as medical records, and determine the variables of acute respiratory infection occurrence.	Cross Sectional	66 Samples in this study.	Shows that the majority of home environmental hygiene is classified as almost half of the respondents (47%) with healthy homes not affected by ISPA, and almost half (39.5%) of respondents with unhealthy homes affected by ISPA. The results of the Spearman Rho test showed that the p-value = 0.000 $\alpha = 0.05$, which means that there is a relationship between home environmental hygiene and the incidence of

Author	Title	Year	Research Objectives	Research Design	Sample	Research Results
(Lubis & Ferusgel, 2019)	The relationship between the physical condition of the house and the presence of smokers in the house and the incidence of Acute Respiratory Tract Infection in toddlers in Silo Bonto Village, Silau Lau District, Asahan Regency.	2019	To determine the relationship between the physical condition of the house and the presence of smokers in the house with the incidence of Acute Respiratory Tract Infection in toddlers in Silo Bonto Village, Silau Laut District, Asahan Regency.	Cross Sectional	The sample size was 62 toddlers.	ISPA in children under five years of age in Mojokerto. Analysis of the relationship between residential density and Acute Respiratory Tract Infection incidence of 72.5% who experienced ISPA incidence in the residential density group in the house, the test results showed a p value of 0.002 (PR = 7.030; 95% CI 2.188-22.585), it can be concluded that there is a significant relationship between residential density and ISPA incidence.

3.2 Discussion

Research conducted by Nurul Hidayah conducted in Pudi Village, North Kelumpang District with a sample of 90 houses that have children under five to determine the relationship between the home environment and the incidence of Acute Respiratory Tract Infection, with the subjects studied acute respiratory tract infection, Environment, Residential Density and Ventilation. The journal in this review proves that there is a relationship between residential density and the incidence of ISPA, the condition of a full room feels quite hot and humid due to the presence of water vapor produced from metabolic evaporation, if it is related to the incidence of disease, residential density can cause infection, where if there are patients with acute respiratory tract infection in one crowded room it will be very fast transmission to others through the air or droplets.

Toddlers who live in a house or room with an unqualified occupancy density will be more ranged with ISPA disease, toddlers who have a room with more than two people have a 14-fold greater risk of acute respiratory infections compared to toddlers who are in a smaller number of rooms, environmental factors associated with ISPA in toddlers is the density of occupancy (Hidayah et al., 2017).

Research related to the incidence of acute respiratory infections was conducted in Betungan, Bengkulu Public Health Center, with the variables studied being age, mother's education, occupation, smoking, room ventilation, floor condition, occupancy density, and wall condition. The reviewed journal found that housing density that does not meet the requirements can increase the risk of ISPA in children under five years old greater than those who meet the requirements. Of the nine variables studied, three factors were found to be strongly associated with the incidence of ISPA in toddlers in Betungan, namely ventilation area, smoking habits at home and residential density (Triana & Purwana, 2019). Iwan's research in Samarinda found an association between residential density and the incidence of pneumonia in toddlers under five years old, these results are consistent with previous research that people living in the house have an important role in the speed of microorganism tracing in the environment, so the density of home occupancy should be a concern for all family members, especially if it is related to the spread of infectious diseases. The density of a very dense house can increase the temperature in the house due to the expenditure of body heat. High indoor air temperatures allow bacteria to multiply and the concentration of bacteria in the built environment changes depending on the number of occupants of the house (Ramdan et al., 2018).

Other findings complement the results of a previous review study that concluded respiratory infections such as childhood pneumonia increased in homes with more than seven occupants with an increase of 1.83 times for every one person increase. The risk of pneumonia increases by 1.15 times when children under five years old sleep with more than 3 people in one room, with an increase of 2.87 times when living in high-density homes, this increased risk occurs because disease-causing pathogens can spread faster in dense environments (Ramdan et al., 2018). The study of environmental factors of housing for ISPA sufferers in toddlers conducted by Ulwia to determine the description of residential density, type of floor and ventilation of the house, with this journal review obtained that the condition of unqualified residential density is higher than the condition of qualified residential density, this is influenced by lack of knowledge about healthy housing and limited economic factors. In addition, residential density can occur because school-age children are also not accustomed to sleeping in their own rooms. Narrow buildings that are not in accordance with the number of occupants will have an impact on the lack of oxygen in the room so that the immune system decreases, then quickly the onset of respiratory diseases such as ISPA. A very narrow room will make breathing difficult and easily infected with diseases by other family members. The more the number of occupants of the house, the faster the room air experiences gas and bacterial pollution, followed by an increase in room CO₂ is a decrease in air quality in the house (Ulwia, 2017).

Research on residential density that does not meet the standard is six times more at risk of having ISPA compared to residential density that meets the standard. The average residential capacity of the respondent's house has 2 rooms with 5-7 members in 1 room, this is due to economic factors, according to the researcher's assumption, residential density is related to the incidence of ISPA because a married couple and has 2 children who are still living, he admits to migrating to get a job and renting a simple house and does not want to buy a house on the grounds that it will not always stay in Pekanbaru city. With the number of family members living in one house can affect the spread of infectious diseases and the speed of transmission of microorganisms, dense residential density ($8\text{m}^2 / \text{person}$) many sufferers of ISPA disease. Therefore, the influence of the health conditions of other residents of the house can cause toddlers to easily contract ISPA (Kursani et al., 2019). The occupancy density of the toddler's room is measured by calculating the length and width of the toddler's bed then calculating the area and dividing by the number of people sleeping including the toddler, the requirements of the Indonesian Ministry of Health 829/199 are fulfilled in 1 room containing a family and in the bedroom inhabited by 1 family consisting of father, mother and children. With high occupancy, the temperature and humidity in a room increase due to the breathing of the occupants.

This study aimed to estimate the proportion of ISPA and its associated factors among children under five years of age in Islamabad Pakistan. Looking at the age of the toddlers the highest was found to be between 2-11 months of age, ISPA was also found to be significantly associated with maternal education, and number of family members, higher prevalence of ISPA was seen in children with inadequate living conditions, low socioeconomic status, and in those with illiterate mothers or low knowledge. Other findings found significant associations between ARI and child nutritional status, immunization status and weaning practices (Jabeen et al., 2017). A house is a residential building that is inhabited, a healthy house must have floors, permanent walls, roofs, sturdy pillars, adequate ventilation, good lighting, adequate water facilities, and available waste disposal facilities. The cleanliness of the home environment is found in several indicators, namely the components of house construction, home sanitation and occupant behavior. The development of technology makes pollution worse and pathogenic microorganisms are also getting stronger. Therefore, it is easier to infect people especially for children because their immune system is not as strong as adults. Children who experience ISPA are children under the age of 2 years (Ratnaningsih & Lusiana, 2020).

Residential density in this study is the ratio of floor area to the number of family members in one house, the floor area of a healthy house building must be sufficient for the number of residents living in it, meaning that the building area that is not proportional to the number of residents will cause Overcrowded. And if the transmission of ISPA disease occurs due to contact between sufferers and other residents of the house, it becomes greater in a house that is densely occupied. Residential density is very sensitive to respiratory tract infections because high residential density affects sensitive inhalation to make it easy to transmit to toddlers and other family members (Lubis & Fergusel, 2019).

4. Conclusion

Based on the results of the literature review on the relationship between occupancy density and the incidence of ISPA in toddlers, namely residential density associated with the incidence of ISPA in toddlers, room conditions that do not meet the requirements of 829/MENKES/SK/VII/1999 concerning housing health, dense housing conditions will feel quite hot and humid produced by the body's metabolism. Respiratory infections in toddlers are at risk if in 1 house there are 5-7 people, there will be a risk of 1.83 times every 1 person and in children under 5 years old sleeping in one room totaling 3 people, the risk increase is 2.87 times and will have an impact on the emergence of pathogens that cause acute respiratory infections. Children under five years of age are very vulnerable to acute respiratory infections. There are several factors associated with the relationship between the incidence of ISPA, namely factors of low economic status and knowledge about healthy homes.

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Conflict of Interest

All Authors declare no conflict of interest and agree with the content of the manuscript.

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