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Risk Factors Associated with the incidence of ISPA in Toddlers (1-5 Years) in the Working Area of North Singkil Health Center, Aceh Singkil Regency

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A B S T R A C T
Upper respiratory tract infection (ARI) is a disease of the upper or lower respiratory tract, which is contagious and can cause a wide spectrum of diseases from asymptomatic to severe and deadly disease. The research aimed to determine the risk factors associated with the incidence of ISPA in toddlers in the North Singkil Community Health Center Working Area, Aceh Singkil Regency. This research is analytical with a case-control research design. Data collection was carried out by interviews using questionnaires. The population in this study was 116 toddlers with a sampling technique, namely Simple Random Sampling. Data collection was carried out on 18-26 July 2023. The analysis used was univariate and bivariate using the Chi-Square and OR statistical tests. The research results show that cigarette smoke is associated with the incidence of ARI with a p-value of 0.001, OR 4.424, LBW p-value 0.004, and OR 3.367, knowledge with a p-value of 0.002, and OR 3.670, immunization status with a p-value of 0.001, and OR 3.868, breastfeeding with p value 0.005, and OR 3.148. Conclusion There is a relationship between cigarette smoke, LBW, immunization status, and breastfeeding with ARI in toddlers. It is hoped that research sites will provide health education about ISPA by holding health education.

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INTRODUCTION

One of the indicators used to determine the health of children under five is health services for children under five, namely services for sick children under five which include upper respiratory tract infections (ARI) (Hulu et al., 2020). ISPA is a disease that is classified as an Air Borne Disease where the transmission can occur through the air that has been contaminated with disease germs and enters the body through the respiratory tract (Setiawaty, Puspaningrum, Nugraha, & Wahyono, 2018; Sumampouw, 2017).

Efforts to prevent ISPA are carried out by maintaining nutritional health by consuming healthy food, carrying out complete immunizations for children so that they are not easily attacked by diseases caused by viruses and illnesses, maintaining a clean environment with a clean and healthy lifestyle, and providing exclusive breast milk (Widianti, 2020)

According to the WHO (World Health Organization) in 2020, ISPA is the main cause of morbidity and mortality from infectious diseases in the world. The ISPA mortality rate reaches 4.25 million every year in the world. ISPA is the cause of 16% of under-five deaths, which is estimated at 920,136 under-fives (Claassen-Weitz, Lim, Mullally, Zar, & Nicol, 2021). According to the Indonesian Ministry of Health (Kemenkes) in 2021, ISPA cases were 31.4%, in 2020 the prevalence of ISPA (upper respiratory tract infection) in children under five was 34.8% and it caused deaths in children under five by 0.16%. This figure increases compared to 2019 by 29.3% (Lea, 2022).

Based on data obtained from the Aceh Provincial Health Service in 2021, the number of under-five deaths was 9.2/1000 live births, the estimated number of ISPA cases was 67,780 people (17%) while the number of ISPA cases discovered and treated was 1,982 people (0.3 %), this figure has increased compared to 2020 of 52,298 people (14%) (Aceh Health Office, 2021). Based on data obtained from the Aceh Singkil Health Service in the period January to November 2022, the number of toddlers in Aceh Singkil was 37,290 people, and the number of toddlers experiencing ISPA was 533 people (1.4%), this figure is still low when compared with ISPA data in Indonesia is 31.4%. The highest prevalence of ISPA in children under five was in the North Singkil Community Health Center with 170 people (30.7%), the Singkohor Community Health Center with 75 people (14%), and the Kuta Baru Community Health Center with 45 people (8.4%) (Singkil District Health Office, 2022).

The results of research conducted by Aristatia and Yulyani (2021) regarding the analysis of factors related to ISPA in toddlers are ventilation, house density, and smoking habits. Research conducted by Lazamidarmi, Sitorus, and Listiono (2021) on factors related to the incidence of ARI in toddlers, it is known that there is a relationship between ventilation, completeness of immunization, and infectious diseases.

ARI is a disease of the upper or lower respiratory tract, which is contagious and can cause death. The prevalence of ISPA (upper respiratory tract infection) in children under five in Indonesia is 34.8% and causes death in children under five by 0.16%. The impact that occurs on toddlers who experience ISPA if proper treatment is not carried out will cause the toddler's

death. Several risk factors influence the occurrence of ISPA, namely environmental factors consisting of air pollution in the house (cigarette smoke and burning), house ventilation and house occupancy density, individual child factors consisting of the child's age, birth weight, vitamin A, behavior, nutritional status, and immunization status

LITERATURE REVIEW

Upper Respiratory Infections (ARI)

The infectious process of ARI can include the upper or lower respiratory tract or even both. This infection can be caused by viruses, bacteria, rickettsia, fungi, or protozoa. ISPA is caused by more than 300 types of viruses, bacteria, and fungi (Lestari, Subardiah, & Haryanti, 2022). ARI is a disease of the upper or lower respiratory tract, which is contagious and can cause a wide spectrum of diseases from asymptomatic disease to severe and fatal diseases depending on the causative pathogen, environmental factors, and host factors (Takaeb, Ndun, & Ndoen, 2019).

Efforts to prevent ISPA are carried out by maintaining nutritional health by consuming healthy food, carrying out complete immunizations for children so that they are not easily attacked by diseases caused by viruses and diseases, maintaining a clean environment with a clean and healthy lifestyle, and providing exclusive breast milk (Handriana, 2021)

Prevention of ISPA is by implementing clean and healthy living habits, namely by washing your hands regularly, especially after doing activities in public places, avoiding touching your face, especially the mouth, nose, and eyes, using a handkerchief or tissue to cover your mouth when sneezing or coughing to prevent disease. does not spread to other people. Increase your consumption of foods rich in vitamins, especially vitamin C, to increase your immune system, clean your house and surrounding environment regularly, stop smoking, get complete vaccines (Ardinasari, 2016)

Research Hypothesis

1. Ha: There is a relationship between exposure to cigarette smoke and the incidence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.
2. Ha: There is a relationship between LBW and the incidence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.
3. Ha: There is a relationship between knowledge and the incidence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.
4. Ha: There is a relationship between immunization status and the incidence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.
5. Ha: There is a relationship between breastfeeding and the occurrence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.

6. Ha: There is a relationship between house ventilation and the occurrence of ISPA in toddlers at the North Singkil Health Center, Aceh Singkil Regency.

METHODOLOGY

Analytical research with a case-control approach. The population in this study was all 116 children under five who were in the North Singkil Health Center Working Area for the period May to June 2023, consisting of 58 people with ISPA and 58 people without ISPA. The samples taken in this study were 116 children under five who were in the North Singkil Health Center Working Area in 2023, consisting of 58 children with ISPA and 58 without ISPA (1:1). Data collection using questionnaires and observations. Data analysis using the Chi-Square statistical test was carried out using SPSS.

RESEARCH RESULT

The number of respondents in this study was 116 toddlers consisting of 58 cases and 58 controls. The results of the univariate analysis of this research can be seen in Table 1, below

Table 1. Frequency Distribution of ISPA, Exposure to Cigarette Smoke, LBW, Mother's Knowledge, Immunization Status, Breastfeeding and Home Ventilation

ISPA incident	**Frequensy**	**Percentage (%)**
Case (ARI)	58	50,0
Control (Not ISP)	58	50,0
Exposure to cigarette smoke	**Frequency**	**Percentage (%)**
There is	81	69,8
There isn't any	35	30,2
LBW	**Frequency**	**Percentage (%)**
LBW	44	37,9
Normal	72	62,1
Knowledge	**Frequency**	**Percentage (%)**
Not enough	64	55,2
Good	52	44,8
Immunization Status		
Incomplete	70	60,3
Complete	46	39,7
History of Breastfeeding	**Frequency**	**Percentage (%)**
There isn't any	64	55,2
There is	52	44,8
Ventilation		
Not eligible	63	54,3
Qualify	53	45,7
Total	**116**	**100.0**

Table 1 shows that in percentage terms it is known that 69.8% have been exposed to cigarette smoke, 62.1% have normal birth weight, 55.2% lack maternal knowledge, 60.3% have incomplete immunization status, 55.2% have no history of breastfeeding and 54.3% of house ventilation does not meet requirements. The statistical test results can be seen in table 2 below:

Table 2. Relationship between exposure to cigarette smoke, LBW, maternal knowledge, immunization status, breastfeeding and home ventilation with the incidence of ARI

Variable	ISPA incident				Total		OR	P value
	Yes		No					
	n	%	n	%	n	%		
Exposure to Cigarette Smoke								
There is	49	84,5	32	55,2	81	100	4,424	0,001
There isn't any	9	15,5	26	44,8	35	100		
LBW								
LBW	30	51,7	14	24,1	44	100	3,367	0,004
Normal	28	48,3	44	75,9	72	100		
Knowledge								
Not enough	41	70,7	23	39,7	64	100	3,670	0,002
Good	17	29,3	35	60,3	52	100		
Immunization Status								
Incomplete	44	75,9	26	44,8	70	100	3,868	0,001
Complete	14	24,1	32	55,2	46	100		
Breastfeeding								
There isn't any	40	69,0	24	41,4	64	100	3,148	0,005
There is	18	30,0	34	58,6	52	100		
Home Ventilation								
Not eligible	41	70,7	22	37,9	63	100	3,947	0,001
Qualify	17	29,3	36	62,1	53			

Table 2 shows that the proportion of ISPA is greater when there is exposure to cigarette smoke 84.5%, LBW 51.7%, lack of knowledge 70.7%, incomplete immunization status 75.9%, no breastfeeding 69% and house ventilation is not meets the requirements of 70.7%.

DISCUSSION

1. The relationship between cigarette smoke and ISPA

The bad effects of cigarette smoke are greater for passive smokers than active smokers. The smoke released from the smoker's mouth is called sidestream smoke. The results of the study showed that in the ISPA group, most of the respondents had smoking families, so there was a relationship between cigarette smoke and the incidence of ISPA in the North Singkil Public Health Center Working Area, Aceh Singkil Regency with an OR value of 4.424, which means that respondents who smoked were 4 times more likely to experience ISPA than those who smoked. do not smoke.

The results of this study support the research of Wardani, Winarsih, and Sukini (2016) which states that there is a relationship between exposure to cigarette smoke and ISPA. The same research also shows that there is a relationship between exposure to cigarette smoke and the incidence of ARI in toddlers (Setiawati, Sari, Hamid, & Hasbiah, 2021). The study of Zhuge et al. (2020) shows that the bad effects of tobacco smoke can increase the risk of respiratory problems in children.

Previous studies have shown that exposure to cigarette smoke in preschool children causes respiratory illnesses and complications such as bronchitis, pneumonia, upper and lower respiratory tract infections, allergic rhinitis, otitis media, increased risk of asthma, and impaired lung function (Rosen et al ., 2018). This research is in accordance with the theory of Maryunani (2010) that cigarette smoke and smoke from burning fuel for cooking in high concentrations can damage the lung defense mechanism, making it easier for ISPA to occur (Katiningrum, 2016).

According to researchers, non-smoking families and those who smoke and live with children and their children both suffer from ARI, these results indicate that smoking increases the estimated risk ratio of respiratory symptoms and diseases in children. This is partly due to the uniqueness of a child who is influenced by his caregivers. Additionally, the reason may be because the sample size of positive cases is small so a larger sample is needed to validate these findings. However, the results of this study provide sufficient evidence that exposure to tobacco smoke from a child's family increases the risk of ARI.

2. Relationship between LBW and ISPA

Low birth weight is a baby born <2500 grams, low birth weight causes disruption of growth, imperfect maturation of the reproductive organs and weak immune system. The results of the study showed that in the ISPA group, most of the respondents had smoking families, so there was a relationship between cigarette smoke and the incidence of ISPA in the North Singkil Community Health Center Working Area, Aceh Singkil Regency with a p-value of 0.004, so there was a relationship between LBW and the incidence of ISPA and there was an OR value 3,367, which means that respondents who are LBW are 3 times more likely to experience ARI than those who are not LBW (Normal).

The results of this research are supported by research by Lestaria and Adisasmita (2021) showing that there is a relationship between LBW and the incidence of ISPA in toddlers. In contrast to Jayatmi and Imaniyah's (2019) research, there is no relationship between LBW and the incidence of ISPA. Low

birth weight is a surrogate marker of intrauterine growth disorders that cause impaired immunocompetence and poor lung anatomical function. LBW has an impact on the body's weak immune system, which puts it at risk of acute respiratory tract infections (Gobel, Kandou, & Asrifuddin, 2021).

According to researchers, toddlers with a normal birth weight at birth are more likely to not experience ARI because they have better immune system compared to toddlers with a history of LBW. Meanwhile, LBW toddlers tend to experience ISPA, this is because toddlers born with LBW development and subsequent growth are not optimal, so they have poor immune system which can make them vulnerable to infectious diseases, one of which is ISPA.

3. Knowledge Relationship with ISPA

The results of the study showed that in the ISPA group, most of the respondents had smoking families, so there was a relationship between cigarette smoke and the incidence of ISPA in the North Singkil Community Health Center Working Area, Aceh Singkil Regency with a p-value of 0.002, so there was a relationship between knowledge and the incidence of ISPA and there was an OR value 3,670, which means that respondents who have less knowledge are 3 times more likely to experience ISPA than those who have good knowledge.

The results of this study support research conducted by Febrianti (2020), which found that there was a significant relationship between maternal knowledge and the incidence of ISPA. Similar research also found a relationship between knowledge and smoking habits and the incidence of ISPA in toddlers at the Posyandu, Kenali Asam Bawah Subdistrict (Fatmawati, 2018).

The behavioral factor (knowledge) in preventing and managing ISPA in babies and toddlers, in this case is the practice of handling ISPA in the family, whether carried out by the mother or other family members (Nurwahidah & Haris, 2019). The family is the smallest unit of society that is collected and lives in a household, each other is interdependent and interacts, if one or several family members have health problems, it will affect the other members (Amila, Pardede, Simanjuntak, & Nadeak, 2021). The active role of the family or community in dealing with ISPA is very important because ISPA is a disease that occurs every day in the community or family. This requires serious attention from all of us because this disease attacks many toddlers, so that mothers of toddlers and family members who are mostly close to toddlers know and are skilled in dealing with ISPA (Fatmawati, 2018).

According to research assumptions, there is no relationship between knowledge and the occurrence of ISPA in children because the proportion of parents with less knowledge in cases is not much different from controls, this could be caused by improved knowledge in parents whose children suffer from ISPA, according to research assumptions good knowledge in cases This is because parents whose children suffer from TB have received education from health workers during ARI treatment.

4. Relationship between Immunization Status and ISPA

The results of the study showed that in the ISPA group, most of the respondents had smoking families, so there was a relationship between immunization status and the incidence of ISPA in the North Singkil Community Health Center Working Area, Aceh Singkil Regency with a p-value of 0.001, so there was a relationship between cigarette smoke and the incidence of ISPA and there was a OR 3.868, which means that respondents with incomplete immunization status were 3 times more likely to experience ARI than those with complete immunization.

The results of this research are supported by research by Gobel et al. (2021), regarding the factors that influence the incidence of ISPA in toddlers, the research results show that there is a relationship between nutritional status and the incidence of ISPA in toddlers. Other research found that there was a relationship between immunization status and the incidence of ISPA (Rahayuningrum & Nur, 2021).

This research is in accordance with the theory that babies and toddlers who have had measles and survive will have natural immunity against pneumonia as a complication of measles. Most ISPA deaths come from types of ISPA that develop from diseases that can be prevented by immunization such as diphtheria, pertussis, measles, so increasing immunization coverage will play a big role in efforts to eradicate ISPA (Modjo & Ali, 2021). If babies and toddlers have complete immunization status, if they suffer from ARI, it is hoped that the disease will not become more severe. The method that has been proven to be the most effective at this time is immunization against measles and pertussis. With effective measles immunization around 11% of toddler pneumonia deaths can be prevented and with pertussis immunization pneumonia deaths can be prevented (Yuliastuti, 2014).

According to researchers, toddlers who experience good nutritional status are more likely to not experience ISPA because toddlers have enough nutrients in their bodies and have good body resistance so they are not susceptible to viruses. Meanwhile, toddlers who experience malnutrition tend to experience ISPA, this is because toddlers who experience malnutrition have poor immune system so that toddlers will be more susceptible to experiencing ISPA, compared to toddlers who are well nourished, where the immune system functions to protect the body. against various diseases that will attack the body, when the body's immune system is poor or decreased, the body does not have protection so it is susceptible to various diseases, one of which is ARI.

5. Relationship between history of exclusive breastfeeding and ARI

The results of the study showed that in the ARI group, most of the respondents had smoking families, so there was a relationship between cigarette smoke and the incidence of ARI in the North Singkil Community Health Center Working Area, Aceh Singkil Regency with a p-value of 0.005, so there was a relationship between the history of exclusive breastfeeding and the incidence of ARI and There is an OR value of 3.148, which means that respondents who have no history of exclusive breastfeeding are 3 times more

likely to experience ARI than those who have a history of exclusive breastfeeding.

The results of this research are supported by research by Khairunisa, Kustiyah, and Ayuningtyas (2022) showing that there is a relationship between breastfeeding and the incidence of ISPA in toddlers. Other research also found a relationship between exclusive breastfeeding and the incidence of ARI. Breast milk is the best first food for the beginning of a baby's life, breast milk contains all the nutrients needed in the right amount and provides antibodies or immune substances to help fight infections (Wijaya, 2019).

Apart from meeting the nutritional needs of babies, exclusive breastfeeding can also reduce deaths due to infection by 88% in babies under three years of age throughout the world. (Hajeebhoy, 2016). The World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of life, then combining it with complementary solid foods until the age of 2 years or more (Berlanga-Macias et al., 2018). Exclusive breastfeeding specifically for the first 6 months of life can reduce infant mortality by around 13%, and is one of the measurement strategies to improve nutritional status and infant survival (Belachew et al., 2018).

According to researchers, toddlers who were exclusively breastfed as babies tend not to experience ARI, this is because toddlers already have good immune system from breast milk, so they are not susceptible to viruses and other diseases.

6. Relationship between ventilation and ARI

The process of bringing in fresh air and creating a space where stale air can be removed, either mechanically or organically, from an enclosed space is called ventilation. Humans need fresh and clean air in their homes and rooms, so unhygienic conditions can arise in poorly ventilated rooms. The results of the study showed that in the ISPA group, most of the respondents had smoking families, so there was a relationship between cigarette smoke and the incidence of ISPA in the North Singkil Community Health Center Working Area, Aceh Singkil Regency with a p-value of 0.001 001, so there was a relationship between cigarette smoke and the incidence of ISPA and there was a relationship between cigarette smoke and the incidence of ISPA. The OR value is 3.947, which means that respondents whose home ventilation does not meet the requirements are 3 times more likely to experience ARI than those whose home ventilation meets the requirements.

The results of this research are supported by Medhyna's (2019) research on the relationship between the physical condition of the home environment and the incidence of ISPA in toddlers. The research results show that there is a relationship between house ventilation and the incidence of ISPA in toddlers. Research by Sudirman, Muzayyana, Saleh, and Akbar (2020) also concluded that there is a relationship between house ventilation. Windows and ventilation holes, apart from being a place for air to come in and out, are also holes for lighting from the outside, keeping the air flow inside the house fresh. According to the house monitoring indicators, the ventilation area that meets health

requirements is ≥ 10% of the house floor area and the ventilation area that does not meet health requirements is < 10% of the house floor area. A house ventilation area that is <10% of the floor area (does not meet health requirements) will result in reduced oxygen concentrations and increased carbon dioxide concentrations which are toxic to the occupants (Keman, 2005).
Acute Respiratory Infections (ARI) are generally caused by bacteria and viruses, where the transmission process is through the air. With good ventilation, air that has been contaminated with germs will easily be replaced with fresh air. In this study, respondents were still found whose house ventilation met the requirements, but suffered from ISPA, this could be caused by the behavior of sufferers who did not open windows, even from field observations, houses were found with windows that could no longer be opened because they had been nailed because animals were entering. like a cat.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research that has been carried out, it can be concluded that there is a relationship between exposure to cigarette smoke, LBW, maternal knowledge, immunization status, breastfeeding and home ventilation with the incidence of ARI in toddlers. The public should increase their knowledge about health, especially ISPA, not smoking, giving breast milk, providing immunizations and maintaining a healthy home environment, so that they can reduce the incidence of ISPA and improve health status.

ADVANCED RESEARCH

This research has limitations when measuring house ventilation because the respondent's house is made of boards so almost everything is open. Then there are weaknesses in the interview process where there are respondents who may not be honest in answering.

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