Completeness and Accuracy of Immunization Status and Smoking Habits Associated with the Incidence of Acute Respiratory Infections in Toddlers in the Kaliasin Health Center Working Area

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Abstract: ARI is the leading cause of infectious disease morbidity and mortality in the world. Nearly four million people die from ARI every year. According to WHO in 2016, the morbidity and mortality rate of ARI is quite high, especially in toddlers. ARI is the number one cause of infant mortality in Indonesia. South Lampung Regency ranks first in the number of ARI cases in children under five every year. The purpose of this study was to determine the factors associated with the incidence of ARI in toddlers. This study is a quantitative study with Cross Sectional design with a population of 2,578 toddlers and a sample of 126 toddlers. The sampling technique used was purposive sampling using univariate and bivariate analysis tests using Chi Square. Toddlers who experience ARI 39.7%, toddlers who have complete immunization status 62.7%, toddlers who have completeness and accuracy of immunization status 27.0% and who have smoking habits 57.9%. There is a relationship between completeness of immunization (p-value = 0.000) with OR 4.450 (CI 2.057-9.624), completeness and accuracy of immunization (p-value = 0.000) with OR 5.553 (CI 1.976-15.607) and smoking habits (p-value = 0.000) with OR 9.419 (CI 3.747-23.677) with the incidence of ARI in toddlers. It is expected that health workers can increase promotive and preventive efforts to the community in the form of counseling or socialization to provide knowledge related to ARI disease.

Keywords: ARI incidence; Immunization; Smoking; Toddlers

Introduction

Acute Respiratory Infections (ARI) are the leading cause of death among children under five worldwide. The most common disease in developing countries is caused by population growth and resulting population density in areas that are not well organized in terms of social, cultural and health. According to WHO in 2016, ARI morbidity and mortality rates are quite high, especially in children under five. ARI is the leading cause of infant mortality reaching 16% due to respiratory disorders in 920,136 people. Mostly in Asia and Africa. The impact of ARI if not treated immediately can result in death, preventing the incidence of ARI cannot be separated from the role of parents who must know how to prevent ARI (Aprilianti, 2021).

ARI is the leading cause of infectious disease morbidity and mortality in the world. Nearly four million people die from ARI each year, 98% of which are caused by lower respiratory tract infections. Mortality rates are particularly high in infants, children and the elderly, especially in countries with low and middle per capita income. ARI is one of the main causes of consultation or hospitalization in health care facilities, especially in pediatric care (WHO, 2020).

The World Health Organization (WHO) reports that the incidence of under-five deaths from acute respiratory infections (ARI) in developing countries is 15-20% per year in the under-5 age group. WHO estimates that ± 13 million children die worldwide each year from ARI, and most of these deaths occur in developing countries. ARI is consistently ranked as the

number one cause of infant mortality in Indonesia, and ARI is often included in the list of top 10 hospital diseases (WHO, 2020).

According to the Ministry of Health, health is important for everyone. Health is a state of physical, mental, spiritual, and social well-being that enables everyone to live a socially and economically productive life (Ministry of Health, 2020). It should be considered for children as it can be a good asset for the future and is favored for good physical, social-emotional and cognitive development (Kinasih et al., 2018). Caused by infectious agents that cause symptoms within hours to days, ARI is the leading cause of infectious morbidity and mortality worldwide. About 4 million people die each year from ARI. Infant, child and elderly mortality is very high, especially in low- and middle-income countries with high per capita mortality (Savitri, 2018).

According to the World Health Organization (WHO), ARI remains a global health problem with 18.8 billion ARI cases worldwide and 4 million deaths annually. The incidence of ARI in developing countries is 2-10 times higher than in developed countries. This difference is related to etiology and risk factors (Nuranini, 2020). The results of the Basic Health Survey (RISKESDAS) in 2018, the prevalence of ARI clinical conditions in Indonesia was 9.3% and the prevalence in Lampung Province was 7.4% and in South Lampung Regency was 5.84%, lower than Lampung Province and the national prevalence. While the highest prevalence of ARI occurred in the age group 1-4 years, namely 11.84% (Kosanke, 2019). Based on data from Lampung Province, ARI is still one of the factors causing under-five deaths every year (Sari, 2023).

An estimated 151.8 million children under the age of 5 years suffer from ARI every year, especially in developing countries including Indonesia. Under-five mortality due to ARI in Indonesia is higher than other ASEAN countries. According to the Indonesian Mortality Study, ARI is responsible for 22.3% of under-five deaths (Prisca, 2021). The incidence of ARI in Indonesia in 2017 was 51.2%, in 2018 it was 56.5% and in 2019 it was 52.9%. The incidence of ARI in Lampung Province in 2017 was 46%, in 2018 it was 48% and in 2019 it increased to 50.84% (Sudarsono, 2020).

Lampung Province, especially South Lampung Regency, ranks first in the number of ARI cases. According to data available at the South Lampung District Health Office, the incidence rate of ARI is 54 per 1,000 population. From the annual P2M report of the South Lampung Health Office, 100,854 (35%) ARI cases out of 293,869 cases in all age groups and 22,069 (7.51%) ARI cases among them occurred in children (Yilmaz, 2021).

In previous research by (Putriyani, 2017) at the Puskesmas Wonoasri Madiun Regency, it was found that there was an influence between the age of toddlers, maternal knowledge, immunization status, occupancy density with the incidence of ARI. In research conducted by Wiwin (2020) at Puskesmas Tamalanrea Jaya Makassar City, it was found that there was a relationship between basic immunization, exclusive breastfeeding, nutritional status and the environment with the incidence of ARI. Another study conducted by Maulana, Hadi et al. (2021) in Hilir Muara Village, Kotabaru Health Center Working Area in 2021 found a relationship between the presence of smokers in the house, ventilation, occupancy density, humidity, maternal attitudes, and immunization status with the incidence of ARI in toddlers.

Based on ARI data from Kaliasin Tanjung Bintang Health Center officers, the incidence of ARI is still quite high, namely 331 cases from January to December 2022. The highest incidence of ARI occurred in Sukanegara Village with 68 cases, 37 cases of male toddlers and 31 cases of female toddlers. The second highest number of cases occurred in Lematang Village with 65 cases, 36 cases of male toddlers and 29 cases of female toddlers. The third highest number of cases occurred in Sindang Sari Village with 60 cases, 32 cases of male toddlers and 28 cases of female toddlers. Kaliasin Village with 53 cases, Sabah Balau Village with 35 cases, Galih Lunik Village with 34 cases, and Way Galih Village with 16 cases (PKM Kaliasin Profile, 2022).

According to Maryunani et al. there are several risk factors for ARI, namely environmental factors, individual child factors and behavioral factors. Environmental factors include indoor air pollution, physical condition of the house, and population density of the house. Individual child factors include child age, birth weight, nutritional status, and immunization status. Meanwhile, behavioral factors relate to the prevention and management of ARI in infants and toddlers, in this case the practice of ARI treatment in the family, both by the mother and other family members. Environmental factors can also be caused by air pollution in the house, such as cigarette smoke, kitchen smoke from cooking with firewood, and the habit of using mosquito coils in the house.

Based on the description of the background above, the author is interested in conducting a research on the Factors Associated with the Incidence of ARI in Toddlers in the Working Area of Kaliasin Health Center in 2023.

Method

This type of research is quantitative research with a cross sectional approach conducted to answer the questions of the study. The research was conducted from December 2022 to January 2023 in the Kaliasin Health Center Working Area with a large population of 2578 toddlers and the sample obtained was 126 respondents. The sampling technique used purposive sampling,

which is a sampling technique with certain considerations according to the characteristics desired and determined by the researcher (Sugiyono, 2020). In this study, researchers selected samples according to the inclusion criteria set by researchers such as toddlers aged 12-60 months, having KMS books, willing to become respondents. This research was conducted in Kaliasin Health Center Working Area. This study was conducted using a questionnaire sheet that had previously been tested for validity and reliability at the Tanjung Bintang Inpatient Health Center with the variables studied, namely immunization status and smoking habits.

Data analysis included frequency distribution and bivariate analysis. Frequency distribution analysis was performed to explain the percentage of nutritional status of toddlers, completeness of immunization, completeness and accuracy of immunization, maternal knowledge, smoking habits and the incidence of ARI in toddlers. Bivariate analysis was performed using chi-square to determine the relationship between the status of immunization completeness, the status of completeness and accuracy of immunization and smoking habits with the incidence of ARI in toddlers.

Approval of the Health Research Ethics Commission at Malahayati University with No. 2998/EC/KEP-UNMAL/XII/2022.

Result and Discussion

Results should be clear and concise. The discussion should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Based on the results of research that has been done that toddlers who experience ARI are 39.7% smaller than those who are not affected by ARI. Toddlers who have complete immunization status are 62.7% more than those who do not have complete immunization. Toddlers who have complete and accurate immunization status are 27.0% lower than those who do not have incomplete and inappropriate immunization status. And respondents who have smoking habits are 57.9% more than those who do not have non-smoking habits. Can be seen in the following Table 1.

Table 1. Frequency Distribution of ARI Incidence, Completeness of Immunization, Completeness and Accuracy of Immunization and Smoking Habits in Kaliasin Health Center Working Area

Variable	Category	Frequency (n=126)	Precentage (%)
Incidence of ARI	ARI	50	39.7
	Not ARI	76	60.3
Immunization Completeness	Complete	79	62.7
	Incomplete	47	37.3
Completeness and Accuracy of Immunization	Complete and precise	34	27.0
	Incomplete and precise	92	73.0
Smoking Habit	Smoking	73	57.9
	No Smoking	53	42.1

Table 2. Results of Analysis of the Relationship between Completeness of Immunization, Completeness and Accuracy of Immunization, and Smoking Habits with the Incidence of ARI in Children Under Five Years Old in Kaliasin Health Center Working Area

No	Variable	ARI	Not ARI	Total	p-value	OR	95 % CI Lower	Upper
1	Immunization Completeness							
	Completeness	29 (61.7%)	18 (38.3%)	79	0.000	4.450	2.057	9.624
	Incomplete	21 (26.6%)	58 (73.4%)	47				
2	Completeness and Accuracy of Immunization							
	Complete and precise	45 (48.9%)	47 (51.1%)	34	0.000	5.553	1.976	15.607
	Inomplete and precise	5 (14.7%)	29 (85.3%)	92				
3	Smoking Habit							
	Smoking	43 (58.9%)	30 (41.1%)	73	0.000	9.419	3.747	23.677
	No Smoking	7 (13.2%)	46 (86.8%)	53				

Based on the table above it can be seen that of the 47 respondents who had incomplete immunization status affected by ARI as many as 29 toddlers or 61.7% more than those not affected by ARI as many as 18 toddlers or 38.3%. Then of the 79 respondents who had complete immunization affected by ARI as many as 21 toddlers or 26.6% lower than those not affected by ARI as many as 58 toddlers or 73.4%. The results of statistical analysis using the Chi-square test at a degree of significance of 95% ($\alpha = 0.05$) obtained a p value = 0.000

or p = <0.05 means Ha is accepted, it can be concluded that there is a significant relationship between completeness with the incidence of URI in toddlers in the Kaliasin Health Center Working Area. The results of this study showed an Odds Ratio (OR) of 4.450 (CI 95% 2.057-9.624) which means that toddlers who do not have complete immunization have a chance of getting ARI as much as 4.450 times compared to toddlers with complete immunization.

Based on the results obtained that of the 92 respondents who were incomplete and inappropriate immunization status affected by ARI as many as 45 toddlers or 48.9% lower than those not affected by ARI as many as 47 toddlers or 51.1%. Then of the 34 respondents who were complete and appropriate immunization status affected by URI as many as 5 toddlers or 14.7% lower than those not affected by URI as many as 29 toddlers or 85.3%. The results of statistical analysis using the Chi-square test at a degree of significance of 95% (α = 0.05) obtained a p value = 0.000 or p = <0.05, meaning that Ha is accepted, it can be concluded that there is a significant relationship between the completeness and accuracy of immunization status with the incidence of ARI in toddlers in the Kaliasin Health Center Working Area. The results of this study showed an Odds Ratio (OR) of 5.553 (CI 95% 1.976-15.607) which means that toddlers who do not have the completeness and accuracy of immunization status have a chance of getting ARI as much as 5.553 times compared to toddlers who have the completeness and accuracy of immunization status.

Based on table 2 above, it can be seen that of the 73 respondents who have smoking habits affected by ARI as many as 43 toddlers or 58.9% more than those not affected by ARI as many as 30 toddlers or 41.1%. Then of the 53 respondents who did not have a smoking habit affected by ARI as many as 7 toddlers or 13.2% lower than those not affected by ARI as many as 46 toddlers or 86.8%. The results of statistical analysis using the Chi-square test at a degree of significance of 95% (α = 0.05) obtained a p value = 0.000 or p = <0.05 means that Ha is accepted, it can be concluded that there is a significant relationship between smoking habits with the incidence of ARI in toddlers in the Kaliasin Health Center Working Area. The results of this study also showed an Odds Ratio (OR) of 9.419 (CI 95% 3.747-23.677) which means that respondents who have smoking habits have a chance of getting ARI as much as 9.419 times compared to respondents who do not smoke.

Acute respiratory infection (ARI) is one of the diseases that can be prevented by immunization. One of the factors causing ARI is the immunization status of children under five. ARI comes from the type of disease that develops from preventable diseases such as diphtheria, pertussis, and measles, so increasing immunization coverage will play a major role in efforts to eradicate ARI. The most effective method to date is measles immunization. When fully immunized before a child reaches 1 year of age, the child will be protected from some of the most common causes of respiratory infections including whooping cough, diphtheria, tuberculosis and measles. Patients with diphtheria, pertussis if they do not receive adequate help will be fatal. Complete immunization can prevent ARI deaths caused by complications of measles and pertussis (Fatimah, 2022).

Incomplete immunization causes weak immunity of toddlers, making it easy to get ARI. Environmental factors where children live can affect the incidence of ARI, good quality housing is needed and meets health requirements to maintain a healthy environment. The quality of a good residential house is determined by the type of building materials used, and is large enough for one family (Asyari, 2021).

These results are similar to research conducted by Wiwin (2020), which found a value of p = 0.008 p <0.05, there is a significant relationship between the completeness of immunization status and the incidence of ARI in toddlers at the Tamalanrea Jaya Health Center, Makassar City. Another study by Fatimah (2022) showed a p value = 0.008 p <0.05, so there is a significant relationship between immunization status and the incidence of ARI in toddlers. The results of this study indicate there is a relationship between immunization status and ARI in sick toddlers (1-5 years).

The high incidence of ARI in toddlers, despite having received complete immunization is due to the absence of vaccines that can prevent ARI directly. Nutritional status, breastfeeding, vitamin A provision and parental knowledge factors can affect the immune system of toddlers so that toddlers are able to ward off a disease, especially ARI. So, even though a child has received complete immunization, the possibility to suffer from ARI still exists (Sambo et al., 2018).

One of the ways to prevent ARI is through immunization. Immunization is very necessary for both children and adults. Immunization is done to maintain our immunity so that we are not susceptible to various diseases caused by viruses/bacteria. Immunization is useful to prevent several types of infectious diseases such as polio, tuberculosis, diphtheria, pertussis, tetanus, hepatitis B and measles. In fact, immunization can also prevent death from these diseases. Diseases classified as ARI that can be prevented by immunization are diphtheria and whooping cough (Amalia, 2020).

ARI disease In developing countries such as Indonesia, very many babies at a young age get infections so immunization must begin to be given at birth and even before birth it is necessary to strive to provide protection, all babies born are immunized before they reach the age of 1 year. With regular immunization, it will provide the body with protection

so that if there is an invasion of germs, the child does not fall ill easily or only suffers from mild diseases that are not fatal (Syamsi, 2019).

Immunization status is closely related to the incidence of ARI disease, not only the completeness of immunization but also the accuracy of the immunization schedule according to the age of toddlers. The accuracy of the immunization schedule based on the schedule according to the recommendations of the Indonesian Pediatric Association (IDAI) greatly affects the child's immunity in preventing certain diseases. By following the immunization schedule, it can be ensured that the child gets maximum protection can be achieved. Sometimes there may be schedule deviations (missed) due to forgetfulness, illness, or for other reasons. If a missed immunization schedule does not need to be repeated, consult with the pediatrician to complete it. The pediatrician may perform catch-up immunizations, give combination vaccines, or give several immunizations at the same time, depending on what is best for the child's condition and age at that time (Anggraeni et al., 2021).

Providing proper and complete immunization is an important factor in maintaining immunity because by following the immunization schedule, maximum protection will be obtained for the toddler's body. In addition, exclusive breastfeeding, vitamin supplementation, and nutritional status also greatly influence the prevention of ARI. Exclusive breastfeeding can increase the immune system of children because breast milk contains antibodies that protect against various diseases and breast milk contains colostrum which is rich in antibodies, because there is protein content for the immune system (Fitri et al., 2020).

The results of research conducted by Anggraeni (2020) obtained a p-value of 0.000 ($\alpha \leq 0.05$) followed by the Contingency Coefficient Test with a value of C = 0.426 indicating that there is a significant relationship between the completeness and accuracy of giving pentabio basic immunization with the incidence of Acute Respiratory Tract Infection in toddlers at the Dinoyo Health Center, Malang City. Another study researched by Anggraeni et al. (2021) with a sample of 164 respondents, obtained the results of chi-square analysis with a value (p-value = 0.000). Based on the results of the analysis, it shows that there is a significant relationship between the completeness and accuracy of basic immunization with the incidence of ARI in toddlers at the Dinoyo Health Center in Malang City.

Smoking is one of the habits commonly found in everyday life, and is one of the public health problems in Indonesia because it is one of the main risk factors for several types of diseases that can cause death. Smoking behavior today seems to be a culture. This is coupled with incessant cigarette advertising that identifies smokers with virility and freshness. For men, the younger they smoke, the greater their sense of pride (Isnan, 2019).

Passive smokers have twice the risk of getting a lung cancer attack than those who smoke. Especially for children, it can increase the risk of getting ARI attacks and lung disorders in the future. Children and family members of smokers suffer more easily and more often from respiratory problems than children and family members of non-smokers. Especially to protect infants and children who are exposed to cigarette smoke, it is necessary to keep them away from puffs of cigarette smoke or family members who smoke are given their own time and room to channel their smoking habits (Syamsi, 2019). The high concentration of CO in smoked cigarette smoke causes COHb levels in the blood to increase. In addition to being harmful to people who smoke, the presence of cigarette smoke containing CO is also harmful to people who are in the vicinity because the smoke can be inhaled.

Based on research conducted by Seda et al. (2021), the p-value is 0.004. so that there is a relationship between the smoking behavior of the closest person with the incidence of ARI in toddlers who seek treatment at the Banjarmasin Cempaka Health Center. Another study conducted by Kurniawan et al. (2021) showed results (p value 0.001) so that there is a relationship between the relationship between exposure to cigarette smoke and the incidence of ARI in toddlers in the working area of the Bandar Agung Terusan Nunyai Health Center, Central Lampung Regency.

Cigarettes are like a chemical factory, in one cigarette smoked about 4,000 harmful chemicals such as Nicotine, Tar, and Carbon monoxide (CO) will be released. Smoking can also make other family members become passive smokers, where people who do not smoke inhale the smoke of people who smoke. The habit of smoking also causes various diseases such as lung cancer, bronchitis, heart disease, and others. It is not only the active smoker who feels this impact, even passive smokers can also feel the impact, even the impact felt is even greater (Seda et al., 2021).

Having one or more smokers in the house will increase the risk of family members suffering from illnesses, such as respiratory problems, worsen asthma and aggravate angina pectoris (a collection of clinical symptoms in the form of chest pain attacks) and can increase the risk of getting ARI attacks, especially in toddlers because the body structure is not perfect or mature where the internal structure of the ear and throat continues to shorten and straighten, and the lymphoid tissue of the tonsils and adenoids continues to increase in size. As a result, otitis media, tonsillitis, and respiratory tract infections often occur (Kurniawan et al., 2021).

Smoking activities by actors or smokers are known as passive smokers and active smokers. Passive smokers

are people who accidentally smoke other people's cigarette smoke, while active smokers are people who carry out smoking activities. Parents' smoking habits in the home make toddlers as passive smokers who are always exposed to cigarette smoke. Houses whose parents have a habit of smoking have the opportunity to increase the incidence of ARI by 7.83 times compared to the home of toddlers whose parents do not smoke in the house. Meanwhile, the number of smokers in a family is quite high (Seda et al., 2021).

The results of this study are in line with research conducted by Rahayu et al. (2018) with the results of the value (p-value = 0.019) indicating that there is a significant relationship between the smoking behavior of family members in the house with the incidence of ARI in toddlers in the Soropia Health Center Working Area of Konawe Regency. This research is supported by research Kusumaningrum (2018) with the title of the Relationship between Smoking Behavior of Nearby People with the Incidence of ARI in Toddlers Who Seek Treatment at the Banjarmasin Cempaka Health Center. Based on the results of the value (pvalue = 0.039) said there was a significant relationship between exposure to cigarette smoke and the incidence of ARI in toddlers at the Banjarmasin Cempaka Health Center.

The results of research conducted by researchers show that most of the people closest to toddlers such as fathers of toddlers and grandfathers of toddlers and other families are active smokers, this can disturb passive smokers, namely family members who do not smoke but are exposed to cigarette smoke, especially toddlers who are often affected. Passive smokers are more often near families who have a habit of smoking so that the air they breathe is contaminated by cigarette smoke which results in ARI, and other respiratory diseases. To avoid this, self-awareness and mutual understanding are needed for families who have a habit of smoking not to smoke in the house and even in the home environment. This aims to minimize the occurrence of respiratory diseases caused by cigarette smoke.

The high level of smoking habits carried out by family members are active smokers, this can interfere with passive smokers, namely family members who do not smoke but are exposed to cigarette smoke, especially children aged 0-5 years who are often affected. Because passive smokers are more often near families who have a habit of smoking so that the air they breathe is contaminated by cigarette smoke. To avoid this, self-awareness and mutual understanding are needed for families who have a habit of smoking not to smoke in the house and even in the home environment, this aims to minimize the occurrence of respiratory diseases caused by cigarette smoke (Herlina, 2019).

The more frequent smoking behavior in the house, increases the possibility of exposure to harmful substances from cigarette smoke to toddlers who are around. Continuous exposure will cause respiratory problems, especially aggravating the onset of acute respiratory infections and lung disorders in adulthood. The more cigarettes smoked by the family, the greater the risk of ARI. The habit of smoking has a negative impact on toddlers as indicated by the incidence of ARI. This is because toddlers are passive smokers who are easily affected by acute respiratory tract or often we call it ARI. Exposure to cigarette smoke caused by family members is very disruptive to air circulation which is continuously inhaled by other family members who do not smoke, especially toddlers. Cigarette smoke inhaled by toddlers can reduce the body's ability to kill bacteria. So the presence of family members who smoke is proven to cause respiratory problems in toddlers. By looking at the results of the study, further health counseling will be carried out to increase parental knowledge and reduce the incidence of ARI in toddlers (Seda et al., 2021).

Conclusion

The results showed that toddlers who experienced ARI 39.7%, toddlers who had complete immunization status 62.7%, toddlers who had complete immunization status and accuracy 27.0% and had smoking habits 57.9%. There was a relationship between completeness of immunization (p-value = 0.000) with OR 4.450 (CI 2.057-9.624), completeness and accuracy of immunization (p-value = 0.000) with OR 5.553. 000) with OR 5.553 (CI 1.976-15.607), smoking habit (p-value=0.000) with OR 9.419 (CI 3.747-23.677) with ARI incidence among toddlers in Kaliasin Health Center working area. The results of this study suggest that promotive and preventive prevention efforts can be improved to the community in the form of counseling or socialization to provide knowledge about ARI disease, the importance of completeness and accuracy of immunization status and immunization monitoring according to schedule and the dangers of cigarette smoke when inhaled by family members, especially toddlers.

Author Contributions
Rohman Daka's role in this research is to compile the background and find problems that occur, design research methods, analyze, process and present data, discuss research results and findings. While the role of Nurul Aryastuti, Dina Dwi Nuryani and Wayan Aryawati is to provide input, direction and improvement in this research.

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