International Journal of Health, Economics, and Social Sciences (IJHESS)
Vol. 8, No. 1, January 2026, pp. 632~639
DOI: 10.56338/ijhess.v8i1.10074
Website: https://jurnal.unismuhpalu.ac.id/index.php/IJHESS

Relationship of Complete Basic Immunization Status to Acute Respiratory Tract Infection in Toddlers in the Tilango Health Center Working Area

Wahyuni Saputri Hudjuala[1], Ridha Hafid[2], Cindy Puspita Sari Haji jafar[3*]
[1]Mahasiswa Program Studi Ilmu Keperawatan UNG
[2,3]Dosen Program Studi Ilmu Keperawatan UNG

***Corresponding Email**: cindy@ung.ac.id

Article Info

Article history:

Received 25 Nov, 2025
Revised 19 Dec, 2025
Accepted 09 Jan, 2026

Keywords:

Immunization, ARTI, toddlers

ABSTRACT

Acute Respiratory Tract Infection is one of the main causes of pain and death in toddlers. The World Health Organization states that this disease is the second cause of death for children under five globally. In Indonesia, especially Gorontalo Province, Acute Respiratory Tract Infection in toddlers is still relatively high, with Gorontalo Regency as the area with the highest number of cases, especially in Tilango. One of the prevention efforts is the provision of complete basic immunization to increase immunity to diseases. This study aims to determine the relationship between complete basic immunization status and Acute Respiratory Tract Infection in toddlers in the working area of the Tilango Health Center. This study is quantitative research with an analytical observational design using a cross-sectional approach. The population of this study was all toddlers with a sample of 92 toddlers using purposive sampling techniques. The research instrument uses checklist sheets. Data analysis with univariate and bivariate using the Chi-Square test. The results showed that there was a relationship between complete basic immunization status and Acute Respiratory Tract Infection in toddlers (p-value < 0.05). Toddlers with incomplete basic immunization status are more likely to experience infections than toddlers with complete basic immunization status. In conclusion, there is a relationship between complete basic immunization status and Acute Respiratory Tract Infection in toddlers. It is recommended to health workers to increase education and complete basic immunization coverage as a preventive measure.

INTRODUCTION

Toddlers are an age group that is susceptible to infectious diseases because the immune system has not developed optimally. One of the diseases that causes the most deaths in toddlers is respiratory disorders or respiratory tract infections (Arini & Syarli, 2022).

Acute Respiratory Tract Infection is still one of the leading causes of pain and death in toddlers globally. The World Health Organization (WHO) reports that Acute Respiratory Tract Infection is the second leading cause of death in toddlers globally, accounting for millions of deaths each year, especially in developing countries. More than 25,000 cases were reported in December 2022, double the number of cases reported in December in the last three years and children under the age of five accounted for 65 to 75 percent of the total number of cases (WHO, 2023; Unicef, 2023).

In Indonesia, Acute Respiratory Tract Infection is also still a significant public health problem and is often found in first-level health services, especially health centers. Based on the results of the Indonesian Health Survey, the prevalence of Acute Respiratory Tract Infection is included in the top ten diseases with the highest prevalence in health care facilities in Indonesia. The spectrum of this disease varies, ranging from mild infections such as rhinitis to severe conditions such as pneumonia that have the potential to cause death in toddlers. Based

on the results of Basic Health Research (Riskesdas) in 2018, the prevalence of Acute Respiratory Tract Infection nationally was recorded at 12.8%. However, this figure has increased significantly to 34.2% based on the results of the 2023 Indonesian Health Survey (SKI). This increase in prevalence shows that despite various control efforts, Acute Respiratory Tract Infection is still a serious threat to the health of toddlers in Indonesia.

Based on data from the Gorontalo Provincial Health Office in 2025, cases of Acute Respiratory Tract Infection in toddlers are still one of the main health problems in all provincial areas. Data shows that Gorontalo Regency ranks highest in the number of cases of Acute Respiratory Tract Infection in toddlers, which is 1,824 cases, followed by Gorontalo City with 1,097 cases, Bone Bolango Regency with 774 cases, Boalemo Regency with 734 cases, Pohuwato Regency with 686 cases, and North Gorontalo Regency with 545 cases. The high number of cases shows that Gorontalo Regency is the area with the highest burden of Acute Respiratory Tract Infection cases in toddlers compared to other districts/cities in Gorontalo Province, so it requires more optimal attention and prevention efforts.

Based on data from the Tilango Health Center, the work area of the Tilango Health Center is one of the health service areas in Gorontalo Regency with a large number of toddlers. There were 1,144 toddlers in the work area of the Tilango Health Center, and of this number, 351 toddlers were reported to have Acute Respiratory Tract Infection. The high number of cases of Acute Respiratory Tract Infection in toddlers shows that respiratory tract infections are still a significant health problem in the work area of the Tilango Health Center. One of the factors that can affect the high incidence rate is the immunization status of toddlers, which plays an important role in the formation of immunity to various respiratory infectious diseases.

Immunization is one of the most effective preventive efforts in protecting toddlers from infectious diseases that can cause respiratory complications, such as diphtheria, pertussis, and measles. These three diseases are infectious diseases that can attack the respiratory tract and contribute to the incidence of Acute Respiratory Tract Infection in children under five years of age. Providing complete basic immunization plays an important role in increasing immunity for toddlers so that it can reduce the risk of respiratory infections.

According to the Ministry of Health of the Republic of Indonesia, toddlers with incomplete immunization status have a higher risk of experiencing Acute Respiratory Tract Infection because their immune system has not been optimally formed. This condition makes toddlers more susceptible to various infectious agents, especially those that attack the respiratory tract. In line with this, the World Health Organization states that the administration of vaccines such as DPT, Hib, and Pneumococcus has been proven to be able to significantly reduce the incidence of acute respiratory infections and pneumonia in children.

Various previous studies have also shown a relationship between immunization status and the incidence of Acute Respiratory Tract Infection in toddlers. From the research of Susilawati et al., (2024) it is said that there is a significant relationship between immunization status and Acute Respiratory Tract Infection. The more complete the immunization status, the smaller the acute respiratory infection. The results of Adriani & Basri's (2021) research show that children who do not receive complete basic immunizations have a higher risk of developing Acute Respiratory Tract Infection compared to children whose immunization status is complete. The results of Rita & Yundelfa's (2023) research show that toddlers who experience recurrent Acute Respiratory Tract Infection are toddlers who have incomplete immunization status. This means that incomplete immunization correlates with an increased risk of recurrent Acute Respiratory Tract Infection in toddlers.

Based on the results of preliminary data obtained on June 12, 2025 in the Gorontalo Regency area, it is known that the incidence of Acute Respiratory Tract Infection in toddlers during the period from January to May 2025 was recorded in the working area of the Tilango Health Center, with a total of 351 cases among toddlers. As a follow-up to the data, researchers conducted initial interviews with 10 mothers who had toddlers with a history of Acute Respiratory Tract Infection. The results of the interviews showed that 6 out of 10 children under five had incomplete basic immunization status. In addition, 7 toddlers were reported to have experienced symptoms of Acute Respiratory Tract Infection in the last six months, and 4 of them were treated at health care facilities.

Based on the description above, the researcher is interested in further researching "The Relationship between Complete Basic Immunization Status and Acute Respiratory Track Infection in Toddlers in the Tilango Health Center Working Area".

RESEARCH METHODS

This study is quantitative research with an analytical observational design using a cross sectional approach. The research population is all toddlers in the working area of the Tilango Health Center as many as 1,144 toddlers. The sampling technique uses purposive sampling. The research instrument is in the form of a checklist sheet. Data analysis was carried out univariate and bivariate using the Chi-Square test.

RESEARCH RESULTS

Respondent Characteristics

Table 1 Characteristics of Respondents by Gender of Toddlers

Gender of Toddlers	N	%
Male	49	53.3
Women	43	46,7
Total	**92**	**100**

Based on table 1, it can be seen that the majority of toddlers are male, namely 49 respondents (53.3%).

Table 2 Characteristics of Respondents by Age of Toddlers

Age of Toddlers (Months)	N	%
12-18	24	26,1
19-24	16	17,4
25-36	25	27,2
37-48	14	15,2
49-60	13	14,1
Total	**92**	**100**

Based on Table 2, it shows that most of the toddlers are in the age group of 25-36 months, namely 25 toddlers (27.2%).

Table 3 Characteristics of respondents by education

Education	N	%
SD	4	4,7
Junior High School	12	14
High School	52	60,5
College	18	20,9
Total	**92**	**100**

Based on table 3, it can be seen that the level of education of mothers is dominated by high school graduates, namely 40 people (43.5%)

Table 4 Characteristics of respondents by Maternal Age

Mother's Age	N	%
Late Youth (17-25)	19	20,7
Early Adulthood (26-35)	63	68,5
Late Adulthood (36-45)	10	10,9
Total	**92**	**100**

Based on Table 4, it can be seen that most of the mothers are in the Early Adult group (26–35 years), which is 63 people (68.5%)

Table 5 Characteristics of respondents by occupation

Jobs	N	%
IRT	80	87
Merchant	8	8,7
Labor	4	4,3
Total	**92**	**100**

Based on table 5, it can be seen that most of the respondents work as IRTs, namely 80 people (87%).

Univariate Analysis

Table 6 Characteristics of respondents by Baseline Immunization Status

Basic Immunization Status	N	%
Complete	37	40,2
Incomplete	55	59,8
Total	**92**	**100**

Based on table 6, it can be seen that the majority of toddlers have incomplete basic immunization status, namely 55 toddlers (59.8%).

Table 7 Characteristics of respondents by Acute Respiratory Tract Infection

Acute Respiratory Tract Infection	**N**	**%**
Never	42	45,7
Ever	50	54,3
Total	**92**	**100**

Based on table 4.7, it can be seen that the majority of toddlers experience Acute Respiratory Tract Infection, namely 50 toddlers (54.3%).

Bivariate Analysis

Table 8 Distribution of Respondents Based on Diagnosis of Acute Respiratory Tract Infection and Baseline Immunization Status

Acute Respiratory Tract Infection	**Immunization**		**N**	**P-value**
	Complete	**Incomplete**		
Never	22	20	42	**0,029**
Ever	15	35	50	
São Paulo	37	55	92	

Based on Table 8, out of a total of 92 toddlers studied, as many as 50 toddlers had experienced Acute Respiratory Tract Infection and 42 toddlers had never experienced Acute Respiratory Tract Infection. In the group of toddlers who had experienced Acute Respiratory Tract Infection, most of them had incomplete basic immunization status, namely 35 toddlers (70.0%), while 15 toddlers with complete basic immunization status (30.0%). Meanwhile, in the group of toddlers who have never experienced Acute Respiratory Tract Infection, the number of toddlers with complete basic immunization status is higher, namely 22 toddlers (52.4%), compared to 20 toddlers with incomplete basic immunization status (47.6%). The results of statistical analysis using the Chi-Square test showed a value of $p = 0.029$, which is smaller than the significance value of $\alpha = 0.05$. This shows that there is a significant relationship between basic immunization status and the incidence of Acute Respiratory Tract Infection in toddlers in the working area of the Tilango Health Center.

DISCUSSION

Basic Immunization Status for Toddlers

The results of the study showed that most of the toddlers in the Tilango Health Center work area had incomplete basic immunization status, namely 55 toddlers (59.8%). These findings show that basic immunization coverage in the region is still not optimal.

Theoretically, the results of this study are in line with the Health Belief Model (HBM) which explains that individual health behavior is influenced by perceived susceptibility, perceived severity, and perceived barriers. Mother's fear of the side effects of immunization is a form of perceived barriers that can hinder health behavior, including in completing basic immunization for toddlers. If the mother considers the risk of immunization side effects to be greater than the benefits obtained, the tendency to delay or refuse basic immunization is higher (Laili et al., 2023).

The results of this study are strengthened by the research of Sari, Rahmawati, and Putri (2020) who reported that most of the toddlers in the research area did not receive complete basic immunization due to parents' concerns about the side effects of immunization. Another study by Fitriani and Lestari (2023) also found that low maternal knowledge and fear of post-immunization adverse events contribute significantly to incompleteness of basic immunization in toddlers.

The results of the study showed that a small percentage of toddlers in the Tilango Health Center work area had complete basic immunization status, namely 37 toddlers (40.2%). These findings show that there are still challenges in achieving complete basic immunization coverage for toddlers in the region.

These findings are in line with the Health Promotion Model put forward by Nola J. Pender, who explains that health behaviors are influenced by knowledge, previous experience, and social support. In the context of immunization, mothers who have a positive experience during the immunization process tend to continue immunization at the next stage. In addition, maternal knowledge of the benefits of vaccines plays an important role in strengthening disease prevention behaviors through the provision of complete basic immunization (Sutarmi et al., 2025).

The results of this study are also supported by the research of Suryani (2021) which found that mothers with a high level of knowledge have twice the chance of completing their children's basic immunizations.

Another study by Alfitri and Hayati (2023) shows that positive maternal attitudes and trust in health workers are significantly related to the completeness of basic immunization in children under five.

Based on the results of the analysis of respondent characteristics, it is known that most of the mothers in this study are in the category of early adulthood and have a secondary education level (SMA). Although at this level of education, mothers should have sufficient ability to receive and understand health information, the coverage of complete basic immunization for toddlers in the work area of the Tilango Health Center is still relatively low. This condition shows that the level of formal education is not always directly proportional to compliance with basic immunization. Parents' decisions to complete immunizations for toddlers are allegedly influenced not only by education, but also by other factors such as access to health services, perception and trust in immunization, and support for the surrounding environment. These findings are in line with several previous studies that have stated that low basic immunization coverage can be influenced by limited information, barriers to access to services, and parents' attitudes and beliefs towards immunization.

Acute Respiratory Tract Infection in Toddlers in the Working Area of the Tilango Health Center

Based on table 4.7, it was found that Acute Respiratory Tract Infection in toddlers in the work area of the Tilango Health Center, has a high number, namely as many as 50 toddlers (54.3%) experience Acute Respiratory Tract Infection, while only 42 toddlers (45.7%) who have never experienced Acute Respiratory Tract Infection have never experienced Acute Respiratory Tract Infection.

The results of the study showed that most of the toddlers in the work area of the Tilango Health Center had experienced Acute Respiratory Tract Infection, namely as many as 50 toddlers (54.3%). This condition can be attributed to the theory that toddlers are an age group that is very susceptible to respiratory infections because their immune systems are not optimally mature. During this time, exposure to various infectious agents such as viruses and bacteria is more likely to cause respiratory distress (Qarimah et al., 2025). WHO (2023) and UNICEF (2023) explained that Acute Respiratory Tract Infection is still the main cause of morbidity and mortality in children under five, especially in developing countries with suboptimal environmental conditions and hygiene behaviors. This is strengthened by a preliminary study conducted at the Tilango Health Center, where 351 cases of Acute Respiratory Tract Infection were found in the January-May 2025 period.

The findings of this study are in line with a study conducted in Jambi in 2020, which showed that toddlers have a higher risk of experiencing Acute Respiratory Tract Infection if exposed to cigarette smoke in the home environment. The study reported that toddlers who lived with smokers' family members had a 4.73 times greater chance of experiencing Acute Respiratory Tract Infection compared to toddlers living in smoke-free homes (Zulfiqar et al., 2020).

The results of the study showed that as many as 42 toddlers (45.7%) did not experience Acute Respiratory Tract Infection. This percentage shows that although Acute Respiratory Tract Infection is one of the diseases that are widely found in toddlers in the work area of the Tilango Health Center, there are still groups of toddlers who do not experience respiratory tract infections. This condition indicates the existence of protective factors that play a role in reducing the risk of Acute Respiratory Tract Infection in toddlers.

Theoretically, this finding can be explained through the concept of infectious disease epidemiology which states that the incidence of disease is influenced by the interaction between host factors, agents, and the environment. Based on the concept of the epidemiological triangle, although toddlers are a vulnerable group, the risk of infection can decrease if exposure to infectious agents is low and supported by good environmental conditions (WHO, 2022).

The results of this study are supported by research by Simanjuntak et al. (2021) which found that toddlers who lived at home with good ventilation had a three times lower risk of developing Acute Respiratory Tract Infection compared to toddlers who lived at home with poor ventilation. In addition, research by Armayukti et al. (2023) showed that the absence of exposure to cigarette smoke in the home was significantly related to a low incidence of Acute Respiratory Tract Infection in toddlers.

Based on the results of the study, the distribution of the incidence of Acute Respiratory Tract Infection was more found in the age group of 25–36 months, which was also the most common age group in this study. These findings are in line with the theory that children aged 1–3 years are more susceptible to respiratory infections due to increased physical activity and interaction with the surrounding environment. At this age, children are more susceptible to pathogens from the environment, especially if the cleanliness and ventilation conditions of the house are less than optimal (Sutarmi et al., 2025).

In addition, the results of the study showed that most of the toddlers were boys, namely 49 toddlers (53.3%), compared to 43 girls under five (46.7%). According to Marlina (2024), boys under five have a higher risk of experiencing Acute Respiratory Tract Infection than female toddlers. This is associated with the tendency of boys to play more actively and interact more often with the outside environment, thus increasing the chances of exposure to infection-causing germs, especially in less clean environments.

when exposed to cigarette smoke in the home environment. In the study, it was reported that toddlers who lived with smokers' family members had a 4.73 times greater chance of experiencing Acute Respiratory Tract Infection than toddlers who lived in smoke-free homes (Zulfiqar et al., 2020).

Relationship of Basic Immunization Status with Acute Respiratory Tract Infection Incidence

The results of the study showed a significant relationship between basic immunization status and the incidence of Acute Respiratory Tract Infection in toddlers in the working area of the Tilango Health Center. Of the 50 toddlers who have experienced Acute Respiratory Tract Infection, most have incomplete basic immunization status, namely 35 toddlers (70.0%), while only 15 toddlers with complete basic immunization status (30.0%). On the other hand, in the group of toddlers who have never experienced Acute Respiratory Tract Infection, the proportion of toddlers with complete basic immunization status is higher, which is 22 toddlers (52.4%), compared to 20 toddlers with incomplete basic immunization status as many as 20 toddlers (47.6%).

The results of statistical analysis using the Chi-Square test showed a p-value = 0.029, which is smaller than the significance value of $\alpha = 0.05$. This shows that there is a meaningful relationship between basic immunization status and the incidence of Acute Respiratory Tract Infection in toddlers in the work area of the Tilango Health Center. These findings indicate that toddlers with incomplete basic immunization status have a higher risk of developing Acute Respiratory Tract Infection compared to toddlers who have received complete basic immunization.

Most of the toddlers diagnosed with Acute Respiratory Tract Infection came from the group with incomplete basic immunization status, which was as many as 35 toddlers (70.0%), which was the highest proportion compared to other groups. These findings suggest that toddlers with incomplete basic immunization status have a higher risk of developing Acute Respiratory Tract Infection compared to toddlers who have received complete basic immunization.

Biologically, immunization plays an important role in forming specific immunity to various infectious diseases, including respiratory tract infections. Toddlers who do not receive complete basic immunizations tend to be more susceptible to exposure to pathogenic microorganisms because their immune systems have not been optimally formed to fight infections (Ministry of Health of the Republic of Indonesia, 2022).

The results of this study are in line with the research of Fatimah and Rustan (2022) which shows that the completeness of basic immunization is closely related to the reduction of the incidence of infectious diseases in children, including Acute Respiratory Tract Infection.

The results showed that there were still 15 toddlers (30%) who experienced Acute Respiratory Tract Infection even though they had received complete basic immunization. These findings suggest that immunization does not provide absolute protection against the occurrence of Acute Respiratory Tract Infection. The Ministry of Health of the Republic of Indonesia states that immunization plays a role in reducing the risk and severity of infectious diseases, but the incidence of Acute Respiratory Tract Infection is also greatly influenced by other factors, especially environmental and behavioral factors, such as exposure to cigarette smoke in the home, poor environmental sanitation, and clean and healthy living behavior in the family (Ministry of Health of the Republic of Indonesia, 2022).

This finding is in line with the research of Zulfiqar, Salimo, and Murti (2020) which reported that toddlers exposed to cigarette smoke have almost five times greater risk of experiencing Acute Respiratory Tract Infection, including in toddlers who have been immunized. On the other hand, the discovery of toddlers with incomplete basic immunization status but not experiencing Acute Respiratory Tract Infection can be attributed to the presence of protective factors, such as more supportive environmental conditions, good home ventilation, low exposure to pathogens, and parenting patterns that are more protective of children's health.

A total of 22 toddlers (52.4%) in the group with complete basic immunization status did not experience Acute Respiratory Tract Infection. These findings are in line with the World Health Organization (WHO, 2022) statement that basic immunization can increase specific immunity to infectious diseases and play a role in preventing the occurrence of Acute Respiratory Tract Infection, especially when supported by good environmental conditions. Environmental health theory explains that a home environment with good air circulation, adequate sanitation, and minimal exposure to pollution can reduce the risk of respiratory diseases.

The results of this study are also in line with the research of Andayani et al. (2022) which showed that the combination of complete basic immunization and a healthy living environment significantly lowered the risk of Acute Respiratory Tract Infection in toddlers. Research by Nugraheni et al. (2021) also emphasized that toddlers with complete basic immunization status who live in smoke-free homes have the lowest risk of Acute Respiratory Tract Infection.

In the group of toddlers with incomplete basic immunization status, there were 20 toddlers (47.6%) who did not experience Acute Respiratory Tract Infection. This condition can be explained through the concept of host–agent–environment in epidemiology, which states that even if the host (toddler) is in a vulnerable condition, infectious diseases will not occur if exposure to infectious agents is low and the environment does not support transmission. A healthy environment and minimal exposure to pathogens can break the chain of transmission of Acute Respiratory Tract Infection (Sutarmi et al., 2025). These findings are also supported by research by Adriani and Basri (2021) which reported that toddlers who live at home with good air quality have a lower risk of Acute Respiratory Tract Infection, regardless of their immunization status.

CONCLUSION

The basic immunization status of toddlers in the work area of the Tilango Health Center showed that of the 92 toddlers studied, as many as 37 toddlers (40.2%) had complete basic immunization status, while 55 toddlers (59.8%) had incomplete basic immunization status.

The incidence of Acute Respiratory Tract Infection in toddlers in the work area of the Tilango Health Center showed that as many as 50 toddlers (54.3%) had been diagnosed with Acute Respiratory Tract Infection, while 42 toddlers (45.7%) had never been diagnosed with Acute Respiratory Tract Infection.

There was a significant relationship between basic immunization status and the incidence of Acute Respiratory Tract Infection in toddlers in the working area of the Tilango Health Center, Gorontalo Regency, with a p-value = 0.029 (< α = 0.05). This shows that toddlers with incomplete basic immunization status have a higher risk of developing Acute Respiratory Tract Infection compared to toddlers with complete basic immunization status.

ADVICE

For the Nursing Profession

The results of this study are expected to be a consideration for the nursing profession in compiling and improving health education programs and preventive measures for Acute Respiratory Tract Infection in toddlers. Nurses play an important role in strengthening health promotion, monitoring immunization status, and educating parents about the prevention of Acute Respiratory Tract Infection through clean and healthy living behaviors.

For Respondents (Toddler Mothers)

It is hoped that mothers of toddlers can increase their understanding of the causes, signs, and prevention efforts of Acute Respiratory Tract Infection in toddlers, and be more active in completing basic immunizations according to schedule. In addition, parents are expected to implement clean and healthy living behaviors in the family to minimize the risk of respiratory infections.

For the Community

The public is expected to increase awareness of the importance of preventing Acute Respiratory Tract Infection in toddlers by creating a healthy environment, maintaining the cleanliness of the home and surrounding environment, and avoiding exposure to cigarette smoke in the house as an effort to protect children's health.

For the Next Researcher

This study is expected to be a reference for future researchers to develop similar research with a wider coverage of the area or by adding other variables related to the incidence of Acute Respiratory Tract Infection and basic immunization status, such as home environmental conditions, pollution exposure, family hygienic behavior, and care patterns of toddlers.

REFERENCES

Adriani, A., & Basri, H. (2021). The relationship between basic immunization status and the incidence of acute respiratory infections in toddlers. Journal of Public Health, 16(2), 123–130.

Alfitri, R., & Hayati, N. (2023). Factors related to the completeness of basic immunization in toddlers. Indonesian Journal of Nursing, 26(1), 45–53.

Andayani, D., Putri, R. A., & Wibowo, A. (2022). The effect of home environment and immunization status on the incidence of ISPA in toddlers. Journal of Environmental Health, 14(3), 201–209.

Arini, D., & Syarli, S. (2022). Vulnerability of toddlers to respiratory infections. Journal of Pediatric Nursing Sciences, 5(2), 78–85.

Armayukti, D., Lestari, F., & Rahman, A. (2023). Exposure to cigarette smoke and the incidence of ISPA in toddlers. National Journal of Public Health, 18(1), 55–63.

Fatimah, S., & Rustan, E. (2022). The relationship between basic immunization completeness and the incidence of ISPA in toddlers. Journal of Muhammadiyah Nursing, 7(2), 110–118.

Fitriani, N., & Lestari, S. (2023). Maternal knowledge and post-immunization follow-up events on basic immunization completeness. Indonesian Health Promotion Journal, 18(1), 67–74.

Gunawan, H. (2020). The role of mothers in fulfilling the nutrition of infants and toddlers. Indonesian Journal of Clinical Nutrition, 16(4), 245–252.

Ministry of Health of the Republic of Indonesia. (2021). Health Profile of Indonesia in 2020. Jakarta: Ministry of Health of the Republic of Indonesia.

Ministry of Health of the Republic of Indonesia. (2022). National immunization guidelines. Jakarta: Ministry of Health of the Republic of Indonesia.

Laili, N., Wulandari, A., & Pratiwi, D. (2023). Maternal perception of basic immunization based on the Health Belief Model. Journal of Preventive Nursing, 4(1), 33–41.

Marlina, R. (2024). Gender factors on the incidence of ISPA in toddlers. Indonesian Journal of Child Health, 11(1), 14–22.
Nugraheni, T., Sari, I. P., & Dewi, M. (2021). The home environment is smoke-free and the incidence of ISPA in toddlers. Journal of Health Epidemiology, 6(2), 98–105.
Qarimah, S., Hasanuddin, M., & Lestari, Y. (2025). Toddler susceptibility to respiratory tract infections. Journal of Pediatric Nursing, 8(1), 1–9.
Rahmawati, E. (2021). Parents' doubts about basic immunization in toddlers. Journal of Maternal and Child Health, 15(3), 187–194.
Rita, Y., & Yundelfa, Y. (2023). Immunization status and recurrence of the incidence of ISPA in toddlers. Journal of Clinical Nursing, 10(2), 89–96.
Sari, D. P., Rahmawati, L., & Putri, A. (2020). Factors that cause basic immunization incompleteness in toddlers. Journal of Public Health, 15(1), 42–50.
Setiawan, B. (2020). Risk factors for the occurrence of ISPA in toddlers. Indonesian Journal of Environmental Health, 19(2), 101–108.
Simanjuntak, R., Nainggolan, S., & Hutabarat, M. (2021). Home ventilation and the incidence of ISPA in toddlers. Journal of Environmental Health, 13(1), 56–63.
Sukmiati, S., & Nafisah, R. (2021). Diet and nutritional status of the baby. Journal of Nutrition and Health, 13(2), 77–85.
Suryani, L. (2021). The relationship between maternal knowledge and the completeness of basic immunization in toddlers. Journal of Community Nursing, 9(1), 22–29.
Sutarmi, N., Widodo, A., & Prasetyo, B. (2025). Risk factors for ISPA in toddlers based on an epidemiological approach. Indonesian Journal of Public Health, 20(1), 15–24.
Susilawati, D., Hidayat, T., & Amalia, R. (2024). Immunization status and incidence of ISPA in toddlers. Journal of Child Health, 12(2), 134–142.
UNICEF. (2023). Pneumonia and acute respiratory infections in children. New York: UNICEF.
World Health Organization. (2020). Immunization in practice. Geneva: WHO.
World Health Organization. (2022). Epidemiology of infectious diseases. Geneva: WHO.
World Health Organization. (2023). Acute respiratory infections among children. Geneva: WHO.
Zulfiqar, A., Salimo, H., & Murti, B. (2020). Exposure to cigarette smoke and the incidence of ISPA in toddlers. Journal of Epidemiology and Public Health, 5(3), 301–309.