

THE ASSOCIATION BETWEEN COMPLETE IMMUNIZATION STATUS AND THE OCCURRENCE OF ACUTE RESPIRATORY INFECTION (ARI) AMONG TODDLERS AT YOSOMULYO PUBLIC HEALTH CENTER

Onikasari¹, Sadiman Sadiman², Gangsar Indah Lestari³

^{1,2,3}Poltekkes Kemenkes Tanjungkarang
E-mail: sadiman@poltekkes-tjk.ac.id

ABSTRAK: HUBUNGAN ANTARA STATUS IMUNISASI LENGKAP DAN KEJADIAN INFEKSI SALURAN PERNAPASAN AKUT (ISPA) PADA BALITA DI PUSKESMAS YOSOMULYO

Infeksi saluran pernapasan akut (ISPA) salah satu penyebab morbiditas dan mortalitas balita di seluruh dunia berdasarkan data World Health Organization 2024 ISPA menyerang 20% anak usia <5 tahun secara global, berdasarkan data SKI tahun 2023 prevalensi ISPA di Indonesia sebesar 24,2%, (Kemenkes RI, 2023). Berdasarkan data Profil Kesehatan Provinsi Lampung tahun 2023 kasus ISPA balita mencapai 211.890 kasus (23,3%), tahun 2023 kasus ISPA di Kota Metro sebanyak 6.342 kasus (35,9%), (Dinkes Kota Metro, 2023). Tahun 2023 kasus ISPA di Puskesmas Yosomulyo sebesar 1.296 kasus (38%) (Dinkes Kota Metro, 2023). Berdasarkan data prasarvei 2024 di Puskesmas Yosomulyo kasus ISPA sebesar 1.094 presentase (32%). Penelitian ini bertujuan untuk mengetahui hubungan status imunisasi dengan kejadian ISPA pada Balita di Puskesmas Yosomulyo. Jenis penelitian ini adalah kuantitatif analitik dengan desain cross-sectional. Populasi pada penelitian adalah seluruh balita yang berkunjung di Puskesmas Yosomulyo dengan jumlah populasi 3.411 balita, dan sampel penelitian berjumlah 94 balita yang dipilih menggunakan teknik accidental sampling. Imunisasi lengkap didefinisikan sebagai upaya meningkatkan kekebalan tubuh dan pembatasan terhadap penyakit menular (Nur, 2015). Verifikasi data status imunisasi dilakukan melalui rekam medis serta wawancara menggunakan kuesioner kepada orang tua. Kejadian ISPA didefinisikan sebagai radang akut yang menyerang sistem saluran pernapasan atas (Maryunani, 2021). Kejadian ISPA dipengaruhi oleh berbagai faktor seperti status imunisasi, status gizi, berat badan lahir, pemberian ASI eksklusif, vitamin A, paparan asap rokok, ventilasi rumah, kepadatan hunian, dan pendidikan orang tua. (Aryunani, 2021). Analisis data dilakukan secara *Univariate* dan *Bivariate* dengan Uji *Chi Square* dengan menentukan tingkat kepercayaan 95% Hasil penelitian proporsi status imunisasi tidak lengkap pada balita sebesar (31,9%), proporsi kejadian ISPA sebesar (45,7%). Hasil uji statistik ada hubungan status imunisasi dengan kejadian ISPA pada balita di Puskesmas Yosomulyo didapatkan p value = 0,000 dan OR 27,000. Peneliti berharap agar pihak Puskesmas Yosomulyo dapat mengoptimalkan verifikasi kelengkapan status imunisasi balita melalui pemantauan Buku KIA dan rekam medis, serta meningkatkan program edukasi kesehatan bagi orang tua balita.

Kata Kunci: Balita, ISPA, status imunisasi

ABSTRACT

Acute Respiratory Infection (ARI) is one of the leading causes of morbidity and mortality among toddlers worldwide. According to the World Health Organization (2024), ARI affects approximately 20% of children under five years of age globally. In Indonesia, the 2023 Indonesian Health Survey (SKI) reported an ARI prevalence of 24.2% among children under five (Ministry of Health of the Republic of Indonesia, 2023). Based on the 2023 Lampung Provincial Health Profile, there were 211,890 ARI cases (23.3%) among toddlers. In Metro City, 6,342 ARI cases (35.9%) were reported in 2023 (Metro City Health Office, 2023). At Yosomulyo Public Health Center, 1,296 ARI cases (38%) were recorded in 2023, while preliminary survey data in 2024 reported 1,094 ARI cases (32%). This study aimed to determine the association between complete immunization status and the occurrence of Acute Respiratory Infection (ARI) among toddlers at Yosomulyo Public Health Center. This quantitative analytic study employed a cross-sectional design. The study population consisted of 3,411 toddlers who visited Yosomulyo Public Health Center, and 94 toddlers were selected using accidental sampling. Complete immunization was defined as the administration of all recommended vaccines according to the national immunization schedule to enhance immunity and protect against vaccine-preventable diseases (Nur, 2015). Immunization status was verified through medical records and interviews with parents using a structured

questionnaire. ARI occurrence was defined as an acute inflammation affecting the upper respiratory tract (Maryunani, 2021). ARI occurrence may be influenced by several factors, including immunization status, nutritional status, birth weight, exclusive breastfeeding, vitamin A supplementation, exposure to cigarette smoke, household ventilation, housing density, and parental education (Maryunani, 2021). Data were analyzed using univariate and bivariate analyses with the Chi-square test at a 95% confidence level. The results showed that 31.9% of toddlers had incomplete immunization, while 45.7% experienced ARI. Statistical analysis demonstrated a significant association between immunization status and ARI occurrence among toddlers at Yosomulyo Public Health Center ($p = 0.000$; OR = 27.00). The findings suggest that Yosomulyo Public Health Center should strengthen the verification of toddlers' immunization status through regular monitoring of the Maternal and Child Health (MCH) Handbook and medical records, as well as enhance health education programs for parents to improve complete immunization coverage and reduce the occurrence of ARI among toddlers.

Keywords: Toddlers, acute respiratory infections, immunization status

INTRODUCTION

Acute Respiratory Infection (ARI) is a disease affecting the respiratory system and remains a major public health problem among children, particularly toddlers (Maryunani, 2021). Globally, the World Health Organization (WHO) reported that approximately 20% of children under five years of age experience ARI (WHO, 2024). In Indonesia, the prevalence of ARI was 24.1% according to the Indonesian Health Survey (Ministry of Health of the Republic of Indonesia, 2023). At the provincial level, the Lampung Provincial Health Office reported 211,890 ARI cases (23.3%) among toddlers in 2023 (Lampung Provincial Health Office, 2023). Meanwhile, in Metro City, the number of ARI cases increased from 2,699 cases (27.5%) in 2021 to 6,342 cases (35.9%) in 2023 (Metro City Health Office, 2021; 2022; 2023).

A similar trend was observed at Yosomulyo Public Health Center, where ARI cases increased from 233 cases (12.3%) in 2021 to 1,296 cases (38.0%) in 2023, although the number declined to 1,094 cases (32.0%) in 2024. The most recent data recorded 138 ARI cases among toddlers during April–May 2025. These findings indicate that ARI remains an important public health concern requiring continuous attention.

The occurrence of ARI is influenced by several factors, including complete immunization status, nutritional status, birth weight, exclusive breastfeeding, vitamin A supplementation, exposure to cigarette smoke, household ventilation, housing density, and parental education (Aryunani, 2021). The impact of ARI extends beyond acute illness, as recurrent infections may impair child growth and development (Maryunani, 2022). If not properly managed, mild ARI may progress to pneumonia, which can lead to death (Ashar, 2022). Furthermore, ARI accounts for approximately 15% of all deaths

among children under five years of age worldwide (WHO, 2024).

Previous studies have demonstrated a significant association between complete immunization status and the occurrence of ARI among toddlers (Wahyuni & Mariati, 2020; Candra et al., 2022). However, these studies primarily relied on parental self-reported data without verification through official medical records, which may have introduced recall bias and reduced the accuracy of clinical diagnoses. In addition, most previous studies focused on simple bivariate analyses without considering potential confounding variables. The novelty of the present study lies in the integration of medical record observations from the Integrated Management of Childhood Illness (IMCI) Unit at Yosomulyo Public Health Center to verify ARI diagnoses confirmed by healthcare professionals, combined with structured questionnaire interviews to assess complete immunization status and control for potential confounding variables.

RESEARCH METHODS

The study was conducted at Yosomulyo Public Health Center from April 21 to May 17, 2025. Data were collected through interviews with parents or guardians using a structured checklist and supported by secondary data. The dependent variable was the occurrence of Acute Respiratory Infection (ARI) among toddlers, which was determined based on medical diagnoses documented in the medical records of the Integrated Management of Childhood Illness (IMCI) Unit at Yosomulyo Public Health Center. ARI occurrence was defined as cases diagnosed during toddlers' healthcare visits within the study period (April 21–May 17, 2025). The diagnosis of ARI was established according to the Integrated Management of Childhood Illness (IMCI) guidelines

issued by the Ministry of Health of the Republic of Indonesia and was confirmed by authorized physicians or healthcare professionals at the Public Health Center. Therefore, the researchers did not independently establish the clinical diagnosis.

Complete immunization status was defined as the receipt of all vaccines recommended according to the national immunization schedule appropriate for the toddler's age. Immunization status was verified using medical records and confirmed through interviews with parents or guardians. Cases with incomplete or undocumented immunization records were classified based on the available medical records and interview data.

Data were analyzed using univariate analysis to describe the distribution of study variables and bivariate analysis using the Chi-square test to determine the association between complete immunization status and the occurrence of ARI. Statistical significance was set at $p \leq 0.05$ (Halim & Syumiarti, 2020).

This study received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Tanjungkarang (Approval No. 148/KEPK-TJK/IV/2025) (Adiputra et al., 2021). Interviews with parents or guardians and access to medical records were conducted with official permission from the management of Yosomulyo Public Health Center. Written informed consent was obtained from all parents or guardians before data collection, and the confidentiality of participants' identities was maintained throughout the study.

RESEARCH RESULT AND DISCUSSION

Results

This study examined the association between complete immunization status and the occurrence of Acute Respiratory Infection (ARI) among toddlers at the Integrated Management of Childhood Illness (IMCI) Unit of Yosomulyo Public Health Center. The study participants were toddlers who received healthcare services during the period of April 21–May 17, 2025. Data were collected through structured questionnaires, medical records, and interviews with parents or guardians. The collected data were analyzed using univariate analysis to describe the characteristics of the participants and bivariate analysis to determine the association between the variables studied.

Respondent Characteristics

The respondent characteristics in this study included 94 toddlers who received healthcare services at the Integrated Management of Childhood Illness (IMCI) Unit of Yosomulyo Public

Health Center. The distribution of respondents' characteristics is presented in the following table.

Table 1. Distribution of Respondent Characteristics by Toddler Age and Parental Education at Yosomulyo Public Health Center, 2025

Tabel 1

Characteristic	N	%
Toddler age		
1- < 3 Years	47	50.0
3- <5 Years	47	50.0
Education		
Low Education	75	79.8
High Education	19	20.1

Based on the analysis of 94 respondents, the distribution of toddler age was evenly divided between the 1–<3 years and 3–<5 years age groups, with 47 toddlers (50.0%) in each group. Regarding maternal education, most mothers were classified as having a low level of education (junior high school and senior high school/vocational high school), accounting for 75 respondents (79.8%), while 19 respondents (20.2%) had a high level of education (diploma or bachelor's degree).

Univariate Analysis

Univariate analysis was performed to describe the distribution of the study variables, including the independent variable (complete immunization status) and the dependent variable (the occurrence of Acute Respiratory Infection [ARI] among toddlers). The results are presented as frequency and percentage distributions for each variable. The findings are presented as follows.

Distribution of Complete Immunization Status Among Toddlers at Yosomulyo Public Health Center

Table 2
Distribution of Complete Immunization Status Among Toddlers at Yosomulyo Public Health Center, 2025

Complete Immunization Status	N	%
Complete	64	68.1
Incomplete	30	31.9

Table 2 shows that, among the 94 toddlers, 30 respondents (31.9%) had incomplete immunization status.

Distribution of Acute Respiratory Infection (ARI) Occurrence Among Toddlers at Yosomulyo Public Health Center

Table 3
Distribution of Acute Respiratory Infection (ARI) Occurrence Among Toddlers at Yosomulyo Public Health Center, 2025

Ari Occurrence	N	%
ARI	43	45.7
No ARI	51	54.3

Table 3 shows that, of the 94 toddlers, 43 (45.7%) experienced Acute Respiratory Infection (ARI).

Bivariate Analysis

Bivariate analysis was performed to determine the association between complete immunization status and the occurrence of Acute

Respiratory Infection (ARI) among toddlers at Yosomulyo Public Health Center, Metro City. The association was analyzed using the Chi-square test, and the results are presented in the following table.

Association Between Complete Immunization Status and the Occurrence of Acute Respiratory Infection (ARI) Among Toddlers at Yosomulyo Public Health Center, Metro City

As shown in Table 4, among the 30 toddlers with incomplete immunization status, most experienced Acute Respiratory Infection (ARI), accounting for 27 toddlers (90.0%), while only 3 toddlers (10.0%) had no ARI. The Chi-square test showed a statistically significant association between complete immunization status and the occurrence of ARI among toddlers ($p < 0.001$). The odds ratio (OR) was 27.000 (95% CI: 7.211–101.091), indicating that toddlers with incomplete immunization status had 27 times higher odds of experiencing ARI than those with complete immunization status

Table 4
Association Between Complete Immunization Status and the Occurrence of Acute Respiratory Infection (ARI) Among Toddlers at Yosomulyo Public Health Center, 2025

Complete Immunization Status	Acute Respiratory Infection (ARI)				Total		P value	OR	95% CI
	No ARI		ARI		n	%			
	n	%	n	%					
Complete	48	75.0%	16	25.0%	64	100%	0,000	27.000	7.211-101.091
Incomplete	3	10.0%	27	90.0%	30	100%			

DISCUSSION

Proportion of Complete Immunization Status Among Toddlers at Yosomulyo Public Health Center

The results of this study at Yosomulyo Public Health Center in 2025 showed that the proportion of toddlers with incomplete immunization status was 30 children (31.9%) out of 94 respondents. Most cases were found among toddlers aged 1–<3 years (16 toddlers). Based on interviews, incomplete immunization was generally caused by the child's health condition at the time of the scheduled immunization. Regarding maternal education, the majority of mothers were categorized as having a low education level (23 mothers), which may affect their understanding of disease prevention (Achjar et al., 2024).

These findings are consistent with Fatimah's study (2022), which reported an incomplete immunization proportion of 32.0%, and lower than the findings of Wulandari (2023) at 49.4% and

Hariyanti (2022) at 45.6%. Complete immunization according to the recommended schedule plays an important role in enhancing children's immunity and preventing infections, including Acute Respiratory Infection (ARI) (Budiyono, 2019).

The researchers assume that immunization coverage in the study area remains suboptimal, as indicated by the presence of toddlers with incomplete immunization status. This condition may increase the risk of preventable diseases, such as ARI.

Proportion of Acute Respiratory Infection (ARI) Occurrence Among Toddlers at Yosomulyo Public Health Center

The results of this study at Yosomulyo Public Health Center in 2025 showed that the occurrence of Acute Respiratory Infection (ARI) among toddlers was 43 children (45.7%) out of 94 respondents. Most ARI cases occurred among toddlers aged 1–<3 years (28 toddlers). Based on maternal

education characteristics, most toddlers experiencing ARI had mothers with low education levels (33 mothers). Education level influences health-related behaviors, where higher education is associated with better understanding of maintaining family health (Anggelina & Wulaningsih, 2025). Low education levels may also contribute to limited knowledge regarding ARI prevention and management (Achjar et al., 2024).

These results are consistent with the study by Mayesti (2024), which reported an ARI proportion of 50%, and higher than the findings of Candra (2022) at 39.8% and Hariyanti (2022) at 40.4%. ARI is a group of infectious diseases affecting the respiratory tract, including upper and lower respiratory tract infections. Upper respiratory tract infections generally include conditions such as pharyngitis caused by bacterial infections (Maryunani, 2021). The high proportion of ARI in this study may be influenced by several risk factors, particularly incomplete immunization status, which can reduce immunity and increase susceptibility to infection.

Association Between Complete Immunization Status and the Occurrence of Acute Respiratory Infection (ARI) Among Toddlers at Yosomulyo Public Health Center

The results of this study at Yosomulyo Public Health Center showed a significant association between complete immunization status and the occurrence of Acute Respiratory Infection (ARI) among toddlers, with a p-value of 0.000 (≤ 0.05). The statistical analysis also showed an Odds Ratio (OR) of 27.000, indicating that toddlers with incomplete immunization status had 27 times higher odds of experiencing ARI compared with toddlers with complete immunization status. This finding indicates that complete immunization plays an important role in reducing the risk of ARI occurrence among toddlers.

These results demonstrate that immunization status is one of the factors associated with infectious disease occurrence. Respiratory infections among toddlers. This study demonstrated an association between complete immunization status and the occurrence of Acute Respiratory Infection (ARI). However, this association should be interpreted cautiously because ARI occurrence is multifactorial and may also be influenced by various other factors.

The results of this study are consistent with the findings of Jaya (2022), who reported a significant association between immunization status and upper respiratory tract infection occurrence ($p =$

0.000). In addition, Wiwin (2020) also demonstrated a significant association ($p = 0.008$), supported by studies conducted by Candra (2022) and Wahyuni (2020), which both found an association between immunization completeness and the occurrence of ARI among toddlers.

Theoretically, immunization functions to enhance children's immune systems by stimulating antibody formation against specific diseases, so toddlers with complete immunization status tend to have better protection against infections (Anggelina & Wulaningsih, 2025). Furthermore, several diseases associated with ARI, such as diphtheria, pertussis, and measles, are vaccine-preventable diseases. Therefore, complete immunization not only provides individual protection but also contributes to herd immunity (Maryunani, 2021). It should be understood that specific immunizations primarily provide protection against certain pathogens and reduce disease severity. Immunization does not directly prevent all types of ARI because the etiology of ARI is highly diverse and may involve various non-vaccine-preventable microorganisms. Appropriate immunization according to the recommended schedule and dosage is essential to maintain vaccine effectiveness in generating an optimal immune response (Budiyo, 2019).

Based on these findings, it can be assumed that toddlers with incomplete immunization status have a higher likelihood of experiencing ARI compared with toddlers who have complete immunization status. Therefore, increasing complete immunization coverage is a strategic effort to reduce ARI occurrence, particularly among toddlers as a vulnerable population. This study has methodological limitations; the use of accidental sampling in selecting study participants may have introduced selection bias, limiting the generalizability of the findings to the entire toddler population in the working area of Yosomulyo Public Health Center. Future studies are recommended to apply probability sampling techniques to improve sample representativeness.

CONCLUSION

Based on the results of the analysis and discussion regarding the association between complete immunization status and the occurrence of Acute Respiratory Infection (ARI) among toddlers at Yosomulyo Public Health Center, it can be concluded that the proportion of toddlers with incomplete immunization status was 31.9%, the occurrence of ARI was 45.7%, and there was a significant association between complete

immunization status and ARI occurrence, as indicated by a p-value of 0.000 and an OR of 27.000.

RECOMMENDATIONS

For educational institutions : The results of this study are expected to be used as an academic reference to enrich learning materials regarding the association between complete immunization status and the risk of ARI occurrence among toddlers. For Yosomulyo Public Health Center : The findings of this study are expected to support the optimization of verification of toddlers' immunization completeness through monitoring of the Maternal and Child Health (MCH) Handbook and medical records, as well as improving health education programs for parents of toddlers. For future researchers : Future studies are recommended to develop research using a prospective cohort design to confirm causal relationships and apply multivariate analysis to comprehensively control potential confounding factors (residual confounding).

REFERENCES

- Achjar, K., Agusfina, M., Yesika, R., & Anibah, S. (2024). *Infectious diseases*. PT Jambi: Sonpedia Publishing Indonesia.
- Adiputra, I. M. S., Trisnadewi, N. W., Oktaviani, N. P. W., & Munthe, S. A. (2021). *Health research methodology*. Denpasar: Yayasan Kita Menulis.
- Anggelina, L., & Wulaningsih, I. (2025). *Steam therapy for children with ARI*. Sleman: Deepublish Digital.
- Anggraeni, E., & Palupi, M. (2020). *Nutrition and Recovery Supplementary Feeding (PMT)*. Ponorogo: Uwais Inspirasi Indonesia.
- Aryuani. (2022). *Midwifery care for neonates, infants, toddlers, and preschool children*. Malang: Rena Cipta Mandiri.
- Ashar, Y. (2022). *Environmental-based disease management*. Surabaya: Cipta Media Nusantara.
- Budiyono, A. (2019). *Immunization (A guide from health and Islamic perspectives)*. Semarang: FKM UNDIP Press.
- Candra, Y., H., & Inayah, H. K. (2022). The relationship between immunization status and household smoking habits with the incidence of ARI among toddlers in the working area of BASECAMP Clinic PT Kideco, Batu Sopang District. *Public Health Journal*, 9(2), 84–89.
- Fatimah, & Rustan, H. (2022). The relationship between immunization status and acute respiratory infection (ARI) in sick toddlers aged 1–5 years. *Health Phenomenon Journal*, 5(1), 101–105.
- Halim, A. L., & Syumiarti. (2020). *Comparison of two proportions using Chi-square test*. Bandung: Cicendo.
- Haryanti, F. J., & Rahmarianti, G. (2022). The relationship between immunization status and exclusive breastfeeding with ARI incidence in infants aged 9–12 months in the working area of Kayu Kunyit Health Center, South Bengkulu Regency. *Manna Midwifery Journal*, 1(1), 1–10.
- Health Office of Metro City. (2021). *Metro City Health Profile 2021*. Metro City.
- Health Office of Metro City. (2022). *Metro City Health Profile 2022*. Metro City.
- Health Office of Metro City. (2023). *Metro City Health Profile 2023*. Metro City.
- Jaya, R., & Ani, S. (2022). The relationship between physical home environment quality and immunization status with the incidence of upper respiratory tract infections in toddlers. *Sulolipu Journal*, 22(1), 231–247.
- Lampung Provincial Health Office. (2023). *Lampung Province Health Profile 2023*. Bandar Lampung.
- Maryunani, A. (2021). *Child health in midwifery*. Jakarta: CV Trans Info Media.
- Mayesti, F. E., & Arifin. (2024). The relationship between basic immunization status and birth weight with ARI incidence in toddlers. *Student Research Journal*, 2(2), 71–75.
- Ministry of Health of the Republic of Indonesia, Health Development Policy Agency. (2023). Indonesian Health Survey (SKI) 2023: Main report. Ministry of Health of the Republic of Indonesia.
- Notoatmodjo, S. (2018). *Health research methodology*. Jakarta: PT Rineka Cipta.
- Wahyuni, F., & Mariati, U. (2020). The relationship between exclusive breastfeeding and immunization completeness with ARI incidence in children aged 12–24 months. *Pediatric Nursing Journal*, 3(1), 10–15.
- Wiwin, & Syaiful. (2020). Factors related to the incidence of ARI in toddlers at Tamalanrea Jaya Health Center, Makassar City. *Scientific Health Diagnosis Journal*, 15(4), 389–393.
- World Health Organization. (2024). Care-seeking for children with symptoms of acute respiratory infection. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/4737>
- World Health Organization. (2024). Children aged

- <5 years with ARI symptoms taken to a health facility (%). <https://who-dev5.prgsdev.com/m/data/gho/indicator-metadata-registry/imr-details/70>
- World Health Organization. (2024). Children aged <5 years with ARI symptoms taken to a health facility (%). <https://who-dev5.prgsdev.com/m/data/gho/indicator-metadata-registry/imr-details/3147>
- Wulandari, P., & Siregar, S. M. F. (2023). The relationship between LBW history, immunization completeness, and household smoking behavior with ARI risk in toddlers in the working area of Meukek Health Center. *Public Health Journal*, 305–318