Analysis of the Characteristics of Toddlers with Pneumonia and Bronchopneumonia at Setio Husodo Hospital for the Period of August 2025–April 2026

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Pneumonia and bronchopneumonia are lower respiratory tract infections that remain the leading cause of morbidity and mortality in toddlers. Differences in patient characteristics are thought to play a role in establishing the diagnosis of these two diseases. This study aims to analyze the effect of age, gender, body temperature, height, weight, nutritional status, length of stay, respiratory rate, and pulse on the diagnosis of pneumonia and bronchopneumonia in toddlers at Setio Husodo Hospital from August 2025 to April 2026. This study used an observational analytical design with a retrospective cross-sectional approach. The study sample consisted of 96 toddlers selected using total sampling technique based on medical record data. Data analysis was performed univariately, bivariately using the ChiSquare test, and multivariately using binary logistic regression with a 95% confidence level (α= 0.05). Multivariate analysis results showed that age (OR = 6.866; 95% CI = 1.966–23,981; p = 0.003) and body temperature (OR = 0.234; 95% CI = 0.063–0.864; p = 0.029) significantly influenced the diagnosis of pneumonia and bronchopneumonia. Gender, height, weight, nutritional status, length of stay, respiratory rate, and pulse rate were not significant (p > 0.05). It was concluded that age and body temperature are factors influencing the diagnosis of pneumonia and bronchopneumonia in toddlers. Healthcare workers are advised to consider these two factors in the early detection and diagnosis process to ensure appropriate patient management.
Keywords: pneumonia, bronchopneumonia, toddlers, logistic regression, diagnosis.

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1. Introduction

Pneumonia is an acute respiratory infection that primarily affects the lungs and is characterized by the accumulation of fluid and pus in the alveoli, thereby interfering with oxygen exchange. This condition can be life-threatening, particularly in children under five years of age (toddlers), whose immune systems have not yet fully developed. Globally, pneumonia remains one of the leading causes of morbidity and mortality among toddlers. Approximately 1.8 million toddlers die from pneumonia each year, with a higher mortality rate than other infectious diseases such as AIDS, malaria, and tuberculosis. The global incidence of pneumonia reaches more than 1,400 cases per 100,000 children annually, with the highest number of cases occurring in South Asia, West Africa, and Central Africa (1).

The World Health Organization (WHO) reports that pneumonia still accounts for approximately 14% of all deaths among children under five years of age, equivalent to around 740,000 deaths annually (2). The 2023 Global Burden of Disease report also indicates that pneumonia causes approximately 2.5 million deaths worldwide, with toddlers being the most vulnerable population (3). Although UNICEF data indicates a 54% reduction in pneumonia-related deaths since 2000, the rate of decline remains relatively slow compared with other infectious diseases (4).

In Indonesia, pneumonia remains a significant public health problem. This disease has been recognized since Ancient Greece, when Hippocrates described symptoms of pulmonary inflammation resembling pneumonia, demonstrating that the disease has long been a concern in the medical field. Scientific understanding of pneumonia developed rapidly during the nineteenth century when George Sternberg and Louis Pasteur successfully identified Streptococcus pneumoniae as the primary causative agent of bacterial pneumonia, establishing an important foundation for understanding its etiology (5,6). Based on pathophysiological theory, pneumonia occurs when pathogenic microorganisms invade the alveoli and trigger an inflammatory response, resulting in fluid accumulation and disruption of the gas exchange process in the lung (7). Tropical environmental conditions, population density, suboptimal nutritional status, and exposure to air pollution in Indonesia further strengthen the interaction between agents, hosts, and the environment, thereby increasing the risk of pneumonia (8).

National data indicates that in 2024, the number of pneumonia cases exceeded 800,000, representing the highest figure in the past five years. In addition to affecting children's health status, pneumonia also imposes a substantial financial burden on the healthcare system. According to data from the Social Security Agency for Health (BPJS Health) in 2023, pneumonia was recorded as the disease with the highest treatment expenditure in Indonesia, with total healthcare costs reaching IDR 8.7 trillion. This situation demonstrates that pneumonia is not merely a clinical problem but also an economic challenge for the national healthcare system (2).

At the regional level, pneumonia among toddlers remains a public health concern requiring special attention in North Sumatra Province. Based on the Acute Respiratory Infection (ARI) Routine Data Reporting System of the North Sumatra Provincial Health Office in August 2025, the target population of toddlers was recorded at 1,436,728 children, with 42,958 visits involving toddlers experiencing cough or difficulty breathing. Furthermore, the estimated number of pneumonia cases among toddlers ranged from 9,351 to 13,285 cases. These data indicate that pneumonia remains relatively common among toddlers in the region (9).

Asahan Regency is one of the areas in North Sumatra Province with a relatively large target population of toddlers, totaling 74,592 children. Based on the August 2025 ARI report, Asahan Regency continued to record pneumonia cases among toddlers, with an estimated 2,230 cases. This situation indicates that pneumonia among toddlers remains a significant public health problem at the district level (9).

As one of the referral healthcare facilities in Asahan Regency, Setio Husodo Hospital plays an important role in managing pneumonia cases among toddlers. Based on a preliminary survey conducted in the inpatient ward, 23 cases of pneumonia and 73 cases of bronchopneumonia were identified. The high number of bronchopneumonia cases indicates that lower respiratory tract infections remain relatively common health problems, particularly among infants and toddlers. This condition requires special attention because bronchopneumonia can develop into a serious illness if not treated promptly and appropriately.

Toddlers are particularly vulnerable to pneumonia because their immune systems are not yet fully developed and they are exposed to various risk factors, including undernutrition, cigarette smoke exposure, air pollution, residential overcrowding, and low immunization coverage. The 2018 Basic Health Research (Riskesdas) data indicates that approximately 6.4% of toddlers in Indonesia have experienced pneumonia, which is associated with demographic, socioeconomic, and household environmental factors (10).

Several previous studies have examined the occurrence of pneumonia among toddlers in Indonesia. A study based on the 2018 Riskesdas data found that children's age, nutritional status, maternal education, household ventilation, and residential overcrowding were associated with pneumonia incidence (11). Research using a multilevel statistical approach also found that socioeconomic factors and the quality of

the residential environment significantly influenced the risk of pneumonia among toddlers (11). Furthermore, retrospective studies conducted in several hospitals, including hospitals in Surakarta, demonstrated associations between nutritional status, population density, weather conditions, and pneumonia incidence (12). Clinical studies in hospitals have also described that pediatric pneumonia patients commonly present with symptoms such as fever, cough, tachypnea, and pulmonary infiltrates on radiological examinations (13).

Although these studies have provided an overview of the risk factors and characteristics of pneumonia among toddlers, most have relied on national data or been conducted in large hospitals, meaning they do not fully represent the conditions of regional hospitals. Studies using medical record data from regional hospitals, particularly Setio Husodo Hospital, remain limited. Furthermore, research using recent data and focusing on specific periods, such as August 2025–April 2026, is still relatively scarce.

Based on a review of previous studies, several research gaps require further attention. Most studies on pneumonia among toddlers in Indonesia have not represented the actual conditions in regional hospitals. Information regarding the demographic and clinical profiles of pediatric pneumonia patients in Asahan Regency has not been systematically documented. Research using recent data and focusing on specific periods remains limited. Furthermore, studies examining the relationship between patient characteristics and treatment outcomes, such as length of hospital stay and patient discharge status, have not been widely investigated at regional hospitals. In addition, the utilization of secondary data from medical records as the primary source for analyzing patient characteristics has not been fully optimized.

Preliminary observations indicate that bronchopneumonia is influenced by several risk factors, one of which is malnutrition or undernutrition. Children with poor nutritional status have weaker immune systems, making them more susceptible to respiratory tract infections. Environmental factors also contribute to the occurrence of bronchopneumonia, including inadequate household ventilation, exposure to indoor cigarette smoke, and air pollution, all of which can adversely affect children's respiratory health. Incomplete administration of the pneumococcal conjugate vaccine (PCV) is also considered one of the factors that may increase children's susceptibility to pneumonia and bronchopneumonia.

In addition to these factors, cases of congenital or neonatal bronchopneumonia have also been identified, which may occur due to the transmission of infection from the mother during pregnancy or childbirth. Based on preliminary observations, patients with bronchopneumonia commonly experience symptoms such as severe shortness of breath, chest wall retractions, cyanosis, high fever, and refusal to breastfeed or consume milk. These symptoms indicate that bronchopneumonia can cause serious respiratory complications. Therefore, optimal prevention, treatment, and disease control efforts are necessary to reduce the incidence of this condition.

2. Literature Review and Problem Statement

Literature Review

Pneumonia and bronchopneumonia are lower respiratory tract infections that remain major health concerns among children under five years of age, particularly because their immune systems are not yet fully developed. Pneumonia is characterized by inflammation of the lung alveoli, which can interfere with oxygen exchange and lead to respiratory complications (1). Globally, pneumonia contributes significantly to morbidity and mortality among toddlers, accounting for approximately 14% of deaths in children under five years of age (2). The occurrence of pneumonia is influenced by various factors, including age, nutritional status, immunization history, environmental conditions, exposure to cigarette smoke, and household ventilation (8,10). Previous studies have also identified associations between demographic characteristics,

socioeconomic conditions, and the risk of pneumonia among toddlers (11). Clinically, children with pneumonia and bronchopneumonia may present with fever, cough, tachypnea, chest wall retractions, and breathing difficulties (13). Therefore, analyzing patient characteristics based on medical records is important to provide an overview of the demographic and clinical profiles of toddlers diagnosed with pneumonia and bronchopneumonia, as well as to support appropriate healthcare management.

Problem Statement

Pneumonia and bronchopneumonia remain important health problems among toddlers and require appropriate medical management. The high vulnerability of this age group, combined with various demographic, clinical, nutritional, and environmental risk factors, makes it necessary to identify the characteristics of affected patients. At Setio Husodo Hospital, preliminary observations identified 23 pneumonia cases and 73 bronchopneumonia cases, indicating a considerable number of lower respiratory tract infections among pediatric patients. However, systematic information regarding the characteristics of toddlers diagnosed with pneumonia and bronchopneumonia during the August 2025–April 2026 period remains limited. This lack of specific information highlights the need for research using medical record data to describe patient characteristics, including age, sex, nutritional status, clinical manifestations, and other relevant clinical variables. Therefore, this study aims to analyze the characteristics of toddlers with pneumonia and bronchopneumonia at Setio Husodo Hospital during the specified period.

Research Focus

This study focuses on analyzing the characteristics of toddlers diagnosed with pneumonia and bronchopneumonia at Setio Husodo Hospital during August 2025–April 2026. The analysis emphasizes the demographic and clinical characteristics of patients based on available medical record data to obtain a clearer description of the distribution and patterns of pneumonia and bronchopneumonia cases among toddlers.

3. Method

This study employed a quantitative research method with an observational analytical design using a retrospective cross-sectional approach. The research utilized secondary data obtained from the medical records of toddlers diagnosed with pneumonia and bronchopneumonia at Setio Husodo Hospital during the period of August 2025–April 2026. The cross-sectional design was selected because the independent and dependent variables were assessed simultaneously based on the patients' medical record data. The study aimed to analyze the characteristics of toddlers diagnosed with pneumonia and bronchopneumonia, including demographic, anthropometric, and clinical characteristics.

The research was conducted at Setio Husodo Hospital in May 2026. The study population consisted of all toddlers aged 0–59 months diagnosed with pneumonia or bronchopneumonia who received treatment at the hospital during the study period. Preliminary medical record data identified 23 pneumonia patients and 73 bronchopneumonia patients, resulting in a total population of 96 patients. The sampling technique used was total sampling, in which all members of the population who met the inclusion and exclusion criteria were included as research samples. The inclusion criteria consisted of toddlers aged 0–59 months, patients diagnosed with pneumonia or bronchopneumonia, and patients with complete medical records. Meanwhile, the exclusion criteria included patients with incomplete medical records and patients who were referred before receiving adequate treatment.

The research variables included age, sex, body weight, body height, nutritional status, body temperature, place of residence, pulse rate, respiratory rate (RR), length of hospital stay, and diagnosis. These variables were used to describe the demographic, anthropometric, and clinical characteristics of the patients. Data

were obtained from medical records and classified according to the operational definitions established in the study. Age was categorized into 0–35 months and 36–59 months, while sex was classified as male or female. Body weight was measured in kilograms, and body height in centimeters. Nutritional status was determined using the weight-for-height (WHZ) index based on the 2006 World Health Organization (WHO) Child Growth Standards. Body temperature, pulse rate, and respiratory rate were classified into normal and abnormal categories based on applicable clinical reference standards. The diagnosis was classified as pneumonia or bronchopneumonia, while the length of hospital stay was categorized into ≤3 days and more than 3 days.

The research instrument consisted of a data collection checklist developed based on the hospital's medical record format to ensure systematic and consistent data recording. The validity and reliability tests of the research instrument were not conducted because the study utilized secondary data obtained from medical records documented by healthcare professionals. Data validity was maintained through the hospital's medical recording procedures and applicable healthcare service standards. The measurement process relies on recorded anthropometric and clinical data, including body weight and height measured by healthcare personnel. Nutritional status was subsequently determined using WHO anthropometric standards. The data source consists of secondary data obtained from the Medical Records Unit of Setio Husodo Hospital, with access and utilization authorized for research purposes.

4. Results and Discussion

Overview of the Research Location

This research was conducted at Setio Husodo Hospital, located at Jalan Sisingamangaraja No. 67, Kisaran Timur District, Asahan Regency, North Sumatra Province. Setio Husodo Hospital is a healthcare facility that provides services to the community, including outpatient, inpatient, emergency, and medical and non-medical support services.

As a general hospital, Setio Husodo Hospital is supported by healthcare professionals and facilities and infrastructure to support the delivery of healthcare services. Facilities include an Emergency Department (ER), outpatient clinic, inpatient wards, laboratory, radiology, pharmacy, nutrition, and medical records.

Setio Husodo Hospital also provides healthcare services to pediatric patients, including toddlers with pneumonia and bronchopneumonia. Hospital medical records served as a source of information for this study, identifying toddler characteristics based on age, gender, weight, height, nutritional status, body temperature, pulse rate, respiratory rate, disease diagnosis, and length of stay.

The selection of Setio Husodo Hospital as the research location was based on the availability of medical record data of toddler patients diagnosed with pneumonia and bronchopneumonia during the period August 2025 to April 2026. Based on the data obtained, the number of respondents who met the research criteria was 96 toddlers.

Univariate Analysis

Table 4.1 Respondent Characteristics Based on Age

Age	F	%
0–35 months	56	58.3
36–59 months	40	41.7
Total	96	100.0

Based on Table 4.1, it is known that of the 96 respondents, the majority were in the 0–35 month age group, namely 56 respondents (58.3%). Meanwhile, respondents aged 36–59 months numbered 40 respondents (41.7%). Thus, the majority of respondents in this study were in the 0–35 month age group.

Table 4.2 Respondent Characteristics Based on Gender

Gender	F	%
Woman	46	47.9
Man	50	52.1
Total	96	100.0

Based on Table 4.2, it is known that of the 96 respondents, 50 respondents (52.1%) were male and 46 respondents (47.9%) were female. These results indicate that the majority of respondents in this study were male.

Table 4.3 Respondent Characteristics Based on Body Weight

Weight	F	%
Normal	66	68.8
Abnormal	30	31.3
Total	96	100.0

Based on Table 4.3, 66 respondents (68.8%) were of normal weight, while 30 respondents (31.3%) were of abnormal weight. Therefore, the majority of respondents in this study were of normal weight.

Table 4.4 Respondent Characteristics Based on Height

Height	F	%
Normal	69	71.9
Abnormal	27	28.1
Total	96	100.0

Based on Table 4.4, it is known that 69 respondents (71.9%) have normal height, while 27 respondents (28.1%) have abnormal height. These results indicate that the majority of respondents have normal height.

Table 4.5 Respondent Characteristics Based on Nutritional Status

Nutritional status	F	%
Normal	46	47.9
Abnormal	50	52.1
Total	96	100.0

Based on Table 4.5, it is known that 50 respondents (52.1%) had abnormal nutritional status, while 46 respondents (47.9%) had normal nutritional status. Thus, the majority of respondents in this study had abnormal nutritional status.

Table 4.6 Respondent Characteristics Based on Body Temperature

Body Temperature	F	%
Normal	38	39.6
Abnormal	58	60.4
Total	96	100.0

Based on Table 4.6, it is known that 58 respondents (60.4%) had an abnormal body temperature, while 38 respondents (39.6%) had a normal body temperature. These results indicate that the majority of respondents had an abnormal body temperature.

Table 4.7 Respondent Characteristics Based on Pulse Rate

Pulse	F	%
Normal	42	43.8
Abnormal	54	56.3
Total	96	100.0

Based on Table 4.7, it is known that 54 respondents (56.3%) had an abnormal pulse rate, while 42 respondents (43.8%) had a normal pulse rate. Thus, the majority of respondents had an abnormal pulse rate.

Table 4.8 Respondent Characteristics Based on Respiratory Frequency

Respiratory Rate	F	%
Normal	48	50.0
Abnormal	48	50.0
Total	96	100.0

Based on Table 4.8, it is known that each group with normal and abnormal respiratory frequencies consisted of 48 respondents (50.0%). These results indicate that the distribution of respondents based on respiratory frequency has the same proportion.

Table 4.9 Respondent Characteristics Based on Disease Diagnosis

Disease Diagnosis	F	%
Bronchopneumonia	73	76.0
Pneumonia	23	24.0
Total	96	100.0

Based on Table 4.9, 73 respondents (76.0%) were diagnosed with bronchopneumonia, while 23 respondents (24.0%) were diagnosed with pneumonia. Thus, the majority of respondents in this study were diagnosed with bronchopneumonia.

Table 4.10 Respondent Characteristics Based on Length of Treatment

Length of Treatment	F	%
Under 3 days	62	64.6
Over 3 days	34	35.4
Total	96	100.0

Based on Table 4.10, 62 respondents (64.6%) underwent treatment for less than 3 days, while 34 respondents (35.4%) underwent treatment for more than 3 days. These results indicate that the majority of respondents underwent treatment for less than 3 days.

Bivariate Analysis

Table 4.11 Relationship between Age and Disease Diagnosis

Age	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
0–35 months	49 (51.0)	7 (7.3)	56 (58.3)
36–59 months	24 (25.0)	16 (16.7)	40 (41.7)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 4.667 (95% CI: 1.694–12.859); p-value = 0.002

Based on Table 4.11, it is known that of the 56 respondents aged 0–35 months, 49 respondents (51.0%) were diagnosed with bronchopneumonia and 7 respondents (7.3%) were diagnosed with pneumonia. Meanwhile, of the 40 respondents aged 36–59 months, 24 respondents (25.0%) were diagnosed with bronchopneumonia and 16 respondents (16.7%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.002 (p less than 0.05), indicating a significant relationship between age and disease diagnosis. The OR value of 4.667 with a 95% CI of 1.694–12.859 indicates that the 36–59 month age group had a 4.667 times greater chance of experiencing pneumonia than the 0–35 month age group.

Table 4.12 Relationship of Gender to Disease Diagnosis

Gender	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Woman	41 (42.7)	5 (5.2)	46 (47.9)
Man	32 (33.3)	18 (18.8)	50 (52.1)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 4.613 (95% CI: 1.546–13.765); p-value = 0.004

Based on Table 4.12, it is known that of the 46 female respondents, 41 respondents (42.7%) were diagnosed with bronchopneumonia and 5 respondents (5.2%) were diagnosed with pneumonia. Meanwhile, of the 50 male respondents, 32 respondents (33.3%) were diagnosed with bronchopneumonia and 18 respondents (18.8%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.004 (p less than 0.05), indicating a significant association between gender and disease diagnosis. The OR value of 4.613 with a 95% CI of 1.546–13.765 indicates that male respondents were 4.613 times more likely to experience pneumonia than female respondents.

Table 4.13 Relationship between Body Weight and Disease Diagnosis

Weight	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	52 (54.2)	14 (14.6)	66 (68.8)
Abnormal	21 (21.9)	9 (9.4)	30 (31.3)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 1.592 (95% CI: 0.598–4.236); p-value = 0.350

Based on Table 4.13, it is known that of the 66 respondents with normal body weight, 52 respondents (54.2%) were diagnosed with bronchopneumonia and 14 respondents (14.6%) were diagnosed with pneumonia. Meanwhile, of the 30 respondents with abnormal body weight, 21 respondents (21.9%) were diagnosed with bronchopneumonia and 9 respondents (9.4%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.350 (p greater than 0.05), indicating no significant association between body weight and disease diagnosis. The OR value of 1.592 with a 95% CI of 0.598–4.236 indicates that the association is not statistically significant.

Table 4.14 Relationship between Height and Disease Diagnosis

Height	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	54 (56.2)	15 (15.6)	69 (71.9)
Abnormal	19 (19.8)	8 (8.3)	27 (28.1)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 1.516 (95% CI: 0.555–4.140); p-value = 0.415

Based on Table 4.14, it is known that of the 69 respondents with normal height, 54 respondents (56.2%) were diagnosed with bronchopneumonia and 15 respondents (15.6%) were diagnosed with pneumonia. Meanwhile, of the 27 respondents with abnormal height, 19 respondents (19.8%) were diagnosed with bronchopneumonia and 8 respondents (8.3%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.415 (p greater than 0.05), indicating no significant association between height and disease diagnosis. The OR value of 1.516 with a 95% CI of 0.555–4.140 indicates that the association is not statistically significant.

Table 4.15 Relationship between Nutritional Status and Disease Diagnosis

Nutritional status	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	41 (42.7)	5 (5.2)	46 (47.9)
Abnormal	32 (33.3)	18 (18.8)	50 (52.1)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 4.613 (95% CI: 1.546–13.765); p-value = 0.004

Based on Table 4.15, it is known that of the 46 respondents with normal nutritional status, 41 respondents (42.7%) were diagnosed with bronchopneumonia and 5 respondents (5.2%) were diagnosed with pneumonia. Meanwhile, of the 50 respondents with abnormal nutritional status, 32 respondents (33.3%) were diagnosed with bronchopneumonia and 18 respondents (18.8%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.004 (p less than 0.05), indicating a significant relationship between nutritional status and disease diagnosis. The OR value of 4.613 with a 95% CI of 1.546–13.765 indicates that respondents with abnormal nutritional status had a 4.613 times greater chance of developing pneumonia compared to respondents with normal nutritional status.

Table 4.16 Relationship between Body Temperature and Disease Diagnosis

Body Temperature	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	23 (24.0)	15 (15.6)	38 (39.6)
Abnormal	50 (52.0)	8 (8.3)	58 (60.4)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 0.245 (95% CI: 0.091–0.660); p-value = 0.004

Based on Table 4.16, it is known that of the 38 respondents with normal body temperature, 23 respondents (24.0%) were diagnosed with bronchopneumonia and 15 respondents (15.6%) were diagnosed with pneumonia. Meanwhile, of the 58 respondents with abnormal body temperature, 50 respondents (52.0%) were diagnosed with bronchopneumonia and 8 respondents (8.3%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.004 (p less than 0.05), indicating a significant relationship between body temperature and disease diagnosis. The OR value of 0.245 with a 95% CI of 0.091–0.660 indicates that the group with an abnormal body temperature had a lower odds of experiencing pneumonia than the group with a normal body temperature. The direction of this relationship needs to be interpreted according to the coding of body temperature categories and diagnoses used in the analysis.

Table 4.17 Relationship of Pulse Rate to Disease Diagnosis

Pulse	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	26 (27.0)	16 (16.7)	42 (43.8)
Abnormal	47 (49.0)	7 (7.3)	54 (56.3)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 0.242 (95% CI: 0.088–0.921); p-value = 0.004

Based on Table 4.17, it is known that of the 42 respondents with a normal pulse, 26 respondents (27.0%) were diagnosed with bronchopneumonia and 16 respondents (16.7%) were diagnosed with pneumonia. Meanwhile, of the 54 respondents with an abnormal pulse, 47 respondents (49.0%) were diagnosed with bronchopneumonia and 7 respondents (7.3%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.004 (p less than 0.05), indicating a significant relationship between pulse rate and disease diagnosis. The OR value of 0.242 with a 95% CI of 0.088–0.921 indicates that the group with an abnormal pulse rate had a lower odds of experiencing pneumonia than the group with a normal pulse rate. Interpretation of the direction of the relationship requires consideration of the category coding in the analysis.

Table 4.18 Relationship between Respiratory Frequency and Disease Diagnosis

Respiratory Rate	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Normal	43 (44.8)	5 (5.2)	48 (50.0)
Abnormal	30 (31.2)	18 (18.8)	48 (50.0)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 5.160 (95% CI: 1.726–15.425); p-value = 0.002

Based on Table 4.18, it is known that of the 48 respondents with normal respiratory rates, 43 respondents (44.8%) were diagnosed with bronchopneumonia and 5 respondents (5.2%) were diagnosed with pneumonia. Meanwhile, of the 48 respondents with abnormal respiratory rates, 30 respondents (31.2%) were diagnosed with bronchopneumonia and 18 respondents (18.8%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.002 (p less than 0.05), which means there is a significant relationship between respiratory frequency and disease diagnosis. The OR value of 5.160 with a 95% CI of 1.726–15.425 indicates that respondents with an abnormal respiratory frequency have a 5.160 times greater chance of experiencing pneumonia compared to respondents with a normal respiratory frequency.

Table 4.19 Relationship between Length of Hospitalization and Disease Diagnosis

Length of Treatment	Bronchopneumonia n (%)	Pneumonia n (%)	Total n (%)
Under 3 days	53 (55.2)	9 (9.4)	62 (64.6)
Over 3 days	20 (20.8)	14 (14.6)	34 (35.4)
Total	73 (76.0)	23 (24.0)	96 (100.0)

OR = 4.122 (95% CI: 1.543–13.014); p-value = 0.003

Based on Table 4.19, it is known that of the 62 respondents with a length of stay of less than 3 days, 53 respondents (55.2%) were diagnosed with bronchopneumonia and 9 respondents (9.4%) were diagnosed with pneumonia. Meanwhile, of the 34 respondents with a length of stay of more than 3 days, 20 respondents (20.8%) were diagnosed with bronchopneumonia and 14 respondents (14.6%) were diagnosed with pneumonia.

The statistical test results showed a p-value of 0.003 (p less than 0.05), which means there is a significant relationship between length of stay and disease diagnosis. The OR value of 4.122 with a 95% CI of 1.543–13.014 indicates that respondents with a length of stay above 3 days had a 4.122 times greater chance of experiencing pneumonia compared to respondents with a length of stay below 3 days.

Multivariate Analysis

Table 4.20 Results of Multivariate Logistic Regression Analysis

Variables	B	SE	Wald	Sig.	OR (Exp(B))	95% CI
Age	1,927	0.638	9,115	0.003	6,866	1,966–23,981
Gender	0.801	0.656	1,491	0.222	2,227	0.616–8.053
Temperature	-1,454	0.667	4,752	0.029	0.234	0.063–0.864
Height	-0.153	1,122	0.019	0.891	0.858	0.095–7.737
Weight	1,378	1,114	1,529	0.216	3,968	0.447–35.251
Nutritional status	-0.774	0.655	1,394	0.238	0.461	0.128–1.666
Length of stay	1,086	0.631	2,957	0.086	2,962	0.859–10.210
Respiratory rate	1,363	0.703	3,757	0.053	3,908	0.985–15.508
Pulse	0.118	0.680	0.030	0.862	1,126	0.297–4.265
Constant	-7,542	2,676	7,944	0.005	0.0001	–

Based on Table 4.20, the results of the multivariate analysis using binary logistic regression indicate that of the nine independent variables analyzed, two variables had a significant relationship with the diagnosis of pneumonia and bronchopneumonia: age and body temperature. This is indicated by the significance values of 0.003 for age and 0.029 for body temperature, both of which are less than 0.05.

The age variable had a regression coefficient of 1.927, an OR of 6.866, and a 95% CI of 1.966–23.981. These results indicate that age has a significant relationship with disease diagnosis after being controlled

for by other variables in the model. The body temperature variable also showed a significant relationship with an OR of 0.234 and a 95% CI of 0.063–0.864.

Meanwhile, the variables of gender (p = 0.222), height (p = 0.891), weight (p = 0.216), nutritional status (p = 0.238), length of stay (p = 0.086), respiratory rate (p = 0.053), and pulse rate (p = 0.862) did not show a statistically significant relationship because they had a significance value greater than 0.05.

These results indicate that age and body temperature are variables that remain associated with the diagnosis of pneumonia and bronchopneumonia after controlling for other variables. Based on the OR value, age has the highest value among the two significant variables. However, determining the age group with higher odds must be adjusted according to the reference category and variable coding in the logistic regression analysis.

Pneumonia and bronchopneumonia are lower respiratory tract infections that remain a health problem in toddlers. Both diseases can affect lung function, particularly oxygen exchange, requiring appropriate medical treatment. The occurrence of infectious diseases is influenced not only by the presence of disease-causing microorganisms but also by individual conditions and the living environment. This is in accordance with the epidemiological triangle theory, which explains that disease occurrence is the result of the interaction between three main components: the host, the agent, and the environment. In the context of pneumonia in toddlers, the host includes the child's characteristics, such as age, gender, and nutritional status, while the agent is the infectious microorganisms, such as bacteria and viruses. The environment encompasses physical and social conditions that can influence exposure to disease-causing agents.

Based on the results of a study of 96 toddlers at Setio Husodo Hospital from August 2025 to April 2026, it was found that the majority of respondents were in the 0–35 months age group, namely 56 respondents (58.3%), while the 36–59 months age group was 40 respondents (41.7%). Based on gender, there were 50 male respondents (52.1%) and 46 female respondents (47.9%). These results indicate that toddler patients with pneumonia and bronchopneumonia in this study were more often found in the 0–35 months age group and were male. This condition illustrates that individual characteristics need to be considered in understanding the incidence of disease in toddlers, considering that each age group and gender can have different biological conditions and levels of susceptibility to respiratory tract infections.

Based on growth characteristics and health status, most respondents had normal weight (66 people) (68.8%) and normal height (69 people) (71.9%). Meanwhile, respondents with abnormal nutritional status numbered 50 people (52.1%), more than respondents with normal nutritional status (46 people) (47.9%). On vital signs examination, most respondents had abnormal body temperature (58 people) (60.4%) and abnormal pulse rate (54 people) (56.3%). Meanwhile, respiratory frequency showed a similar distribution, namely 48 respondents (50.0%) had normal respiratory frequency and 48 respondents (50.0%) had abnormal respiratory frequency. These results indicate that patients with pneumonia and bronchopneumonia have variations in growth and clinical conditions that need to be considered during the examination and treatment process.

Based on disease diagnoses, the majority of respondents (73 people) had bronchopneumonia, while 23 (24.0%) had pneumonia. Furthermore, most respondents received treatment for less than 3 days (62 people) while 34 (35.4%) had a length of stay of more than 3 days. This difference in the number of diagnoses indicates that bronchopneumonia was the most frequently found diagnosis in the medical records of this study. Meanwhile, patient length of stay can be influenced by clinical condition, response to treatment, the presence of comorbidities, and medical considerations during treatment. Therefore, the characteristics of diagnoses and length of stay need to be considered as part of the picture of health care for toddlers with lower respiratory tract infections.

The results of the bivariate analysis showed that age (p = 0.002), gender (p = 0.004), nutritional status (p = 0.004), body temperature (p = 0.004), pulse rate (p = 0.004), respiratory rate (p = 0.002), and length of stay (p = 0.003) had a significant relationship with the diagnosis of pneumonia and bronchopneumonia. Meanwhile, body weight (p = 0.350) and height (p = 0.415) did not show a significant relationship. These findings indicate that several individual characteristics and clinical conditions are related to differences in disease diagnoses in respondents. However, the results of the bivariate analysis cannot explain whether these relationships are independent because they do not consider the influence of other variables simultaneously. Therefore, a multivariate analysis is needed to determine which variables remain related after controlling for other factors.

The results of multivariate analysis using binary logistic regression showed that age (p = 0.003; OR = 6.866; 95% CI = 1.966–23.981) and body temperature (p = 0.029; OR = 0.234; 95% CI = 0.063–0.864) were variables that remained significantly associated with the diagnosis of pneumonia and bronchopneumonia. Meanwhile, gender, weight, height, nutritional status, length of stay, respiratory rate, and pulse rate did not show a significant association after being controlled for together in the model. These results indicate that the relationship between several variables found in the bivariate analysis may change after considering other variables. Age was the variable with the largest OR value among the significant variables in the model. However, the direction of the relationship between age and body temperature should be interpreted based on the reference category and variable coding in the logistic regression analysis.

Overall, the results of this study indicate that toddler characteristics and clinical conditions play a role in differentiating diagnoses of pneumonia and bronchopneumonia. The findings regarding age and body temperature, which remained significant in the multivariate analysis, emphasize the importance of considering both age and clinical conditions in toddlers during examination and treatment. Furthermore, the lack of a significant relationship between weight and height does not imply that these two indicators are unimportant for children's health; rather, they have not been shown to have an independent relationship with disease diagnosis in this study. Therefore, comprehensive management of pneumonia and bronchopneumonia in toddlers requires clinical examination, vital sign monitoring, nutritional needs, and attention to environmental factors that may increase the risk of infection. These findings are expected to serve as a reference for healthcare professionals and families in improving early detection, prevention, and treatment of respiratory tract infections in toddlers.

5. Conclusion

Based on the results of research on the analysis of the characteristics of pneumonia and bronchopneumonia patients in toddlers at Setio Husodo Hospital for the period August 2025–April 2026, it can be concluded that most patients were in the age group of 0–35 months, male, had normal weight, height, and nutritional status, and experienced abnormal body temperature, pulse, and respiratory rate. Most patients were also hospitalized for less than three days. The results of the bivariate analysis showed that age, gender, nutritional status, body temperature, pulse, respiratory rate, and length of stay had a significant relationship with the diagnosis of pneumonia and bronchopneumonia (p0.05).

The results of the multivariate analysis showed that age and body temperature were significantly associated with the diagnosis of pneumonia and bronchopneumonia after being controlled for with other variables. Age was the most dominant factor, indicating a change in the tendency of disease diagnoses as toddlers age. Furthermore, abnormal body temperature is a clinical manifestation of lower respiratory tract infection associated with disease diagnosis. Gender, weight, height, nutritional status, length of stay, respiratory rate, and pulse rate did not show a significant association in the multivariate analysis and were therefore not proven to be independent factors in this research model. Overall, age and body temperature

were the most influential factors in the association with the diagnosis of pneumonia and bronchopneumonia in toddlers at Setio Husodo Hospital during the period August 2025–April 2026.

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