Termometer: Jurnal Ilmiah Ilmu Kesehatan dan Kedokteran
Volume. 3, Nomor. 3 Juli 2025
e-ISSN :2964-9676; p-ISSN :2964-9668, Hal. 326-334
DOI: https://doi.org/10.55606/termometer.v3i3.5992
Tersedia: https://ejurnal.politeknikpratama.ac.id/index.php/Termometer

The Relationship Between the Frequency of Antenatal Care Visits and the Incidence of Low Birth Weight (LBW) at the Morodadi Community Health Center

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Abstract: *Low Birth Weight (LBW) remains a significant public health problem and is associated with increased risks of neonatal morbidity and mortality. Antenatal Care (ANC) plays a crucial role in monitoring maternal and fetal health and preventing adverse birth outcomes. This study aimed to determine the relationship between the frequency of Antenatal Care visits and the incidence of Low Birth Weight at Morodadi Public Health Center. An analytical observational study with a cross-sectional design was conducted using secondary data from maternal health records between January and September 2025. The study population consisted of 51 pregnant women, selected using a total sampling technique. The independent variable was the frequency of Antenatal Care visits, while the dependent variable was the incidence of Low Birth Weight. Data were analyzed using descriptive statistics and the Spearman rank correlation test. The results showed that 92.2% of mothers complied with the recommended ANC visit frequency, while 7.8% were non-compliant. Low Birth Weight was identified in 13.7% of newborns. Bivariate analysis revealed a strong and statistically significant relationship between the frequency of Antenatal Care visits and the incidence of Low Birth Weight ($r = 0.731$; $p < 0.05$). In conclusion, adequate Antenatal Care visit frequency is significantly associated with improved birth weight outcomes. Strengthening maternal compliance and enhancing the quality of Antenatal Care services are essential strategies to reduce the incidence of Low Birth Weight.*

Keywords: *Antenatal Care; Fetal Health*; *Low Birth Weight; Maternal Health*; *Pregnancy.*

1. INTRODUCTION

Maternal and neonatal health remains a crucial indicator of public health development, particularly in developing regions. The condition of a newborn at birth is strongly influenced by the health status of the mother during pregnancy, childbirth, and the postpartum period. One of the major neonatal health problems that continues to receive global attention is Low Birth Weight (LBW). Low birth weight is defined as a birth weight of less than 2,500 grams regardless of gestational age and is closely associated with increased risks of neonatal morbidity, mortality, and long-term developmental problems (Ningsih, 2020).

Low birth weight not only contributes to short-term health complications such as hypothermia, infections, and respiratory disorders, but also leads to long-term consequences including impaired physical growth, cognitive development delays, and a higher risk of chronic diseases later in life. Various maternal factors have been identified as contributors to LBW, including maternal age, nutritional status, parity, birth spacing, underlying diseases, and health-seeking behavior during pregnancy (Fitratur Rahmah Agustina et al., 2025). Therefore, preventing LBW requires comprehensive and continuous maternal health care starting from early pregnancy.

Naskah Masuk: 17 Mei 2025; Revisi: 23 Juni 2025; Diterima: 28 Juli 2025; Terbit: 31 Juli 2025

Antenatal Care (ANC) is one of the essential maternal health services designed to ensure the well-being of both mother and fetus throughout pregnancy. ANC provides an opportunity for early detection of pregnancy-related complications, monitoring of fetal growth, nutritional assessment, and health education for pregnant women. Adequate and regular ANC visits are expected to reduce adverse pregnancy outcomes, including low birth weight, by ensuring timely interventions and appropriate medical management (Tunny & Astuti, 2022).

In Indonesia, the standard of Antenatal Care includes a minimum of four visits during pregnancy, commonly referred to as K1 to K4, with recent health policies recommending up to six visits to improve maternal and fetal outcomes. Regular ANC visits enable healthcare providers to identify risk factors early and provide preventive or corrective measures (Purba et al., 2020). However, inadequate frequency or suboptimal utilization of ANC services may result in delayed detection of complications, increasing the likelihood of adverse birth outcomes such as LBW (Devi, 2025).

Despite improvements in ANC coverage in many areas, the incidence of low birth weight remains a public health concern. This indicates that the frequency of ANC visits alone may not be sufficient to guarantee optimal pregnancy outcomes. Other factors such as the quality of care, maternal compliance with medical advice, nutritional intake, and socioeconomic conditions also play significant roles in determining birth outcomes (Sari Yuda Muhara, 2021). Consequently, further investigation is required to understand the effectiveness of ANC visit frequency in preventing LBW.

Preliminary data collected at Morodadi Public Health Center in South Morotai District, Pulau Morotai Regency, from January to September 2025 recorded a total of 50 pregnant women who received antenatal care services. Most of the pregnant women had completed their initial ANC visits, and a substantial proportion had fulfilled the recommended number of visits up to the fourth and sixth visits. However, cases of low birth weight were still identified among mothers who had completed the recommended ANC visits.

These preliminary findings suggest that low birth weight remains an existing problem in the working area of Morodadi Public Health Center despite relatively good ANC coverage. This condition raises important questions regarding the relationship between the frequency of antenatal care visits and the occurrence of low birth weight. Understanding this relationship is essential for evaluating the effectiveness of maternal health services and identifying potential gaps in antenatal care delivery.

Based on the background described above, this study aims to determine the relationship between the frequency of Antenatal Care visits and the incidence of Low Birth Weight at Morodadi Public Health Center. The findings of this study are expected to provide valuable information for improving the quality of antenatal care services and strengthening strategies to prevent low birth weight in the study area.

2. RESEARCH METHOD

This study employed an analytical observational design with a cross-sectional approach. The research was conducted at Morodadi Public Health Center, South Morotai District, Pulau Morotai Regency. The study was carried out using secondary data obtained from maternal and child health records during the period of January to September 2025.

The study population consisted of all pregnant women who received antenatal care services at Morodadi Public Health Center during the study period. A total sampling technique was applied, resulting in a sample of 50 pregnant women. The independent variable was the frequency of Antenatal Care visits, while the dependent variable was the incidence of Low Birth Weight.

Data were analyzed using descriptive and inferential statistical methods. Descriptive analysis was used to present frequency and percentage distributions, while the relationship between the frequency of Antenatal Care visits and Low Birth Weight was analyzed using appropriate statistical tests with a significance level of 0.05.

3. RESULTS AND DISCUSSION

Results

Univariat Analyze

Univariate analysis was conducted to describe the distribution of respondents' characteristics and research variables, including maternal age, educational level, occupation, frequency of Antenatal Care (ANC) visits, and the incidence of Low Birth Weight (LBW).

Table 1. Distribution of Maternal Age

Maternal Age	Frequency (n)	Percentage (%)
< 20 years	32	62.7
20–35 years	13	25.5
> 35 years	6	11.8
Total	51	100.0

Table 1 shows that the majority of respondents were aged less than 20 years, accounting for 32 respondents (62.7%). Mothers aged 20–35 years comprised 13 respondents (25.5%), while those aged over 35 years accounted for 6 respondents (11.8%). This indicates that most

pregnant women were in a younger age group, which may be associated with increased pregnancy-related risks.

Table 2. Distribution of Maternal Educational Level

Educational Level	Frequency (n)	Percentage (%)
Elementary School	20	39.2
Junior High School	20	39.2
Senior High School	11	21.6
Total	51	100.0

Based on Table 2, most respondents had low to moderate educational levels. Mothers with elementary and junior high school education each accounted for 20 respondents (39.2%), while 11 respondents (21.6%) had completed senior high school. This distribution suggests that maternal education in the study area remains relatively limited.

Table 3. Distribution of Maternal Occupation

Occupation	Frequency (n)	Percentage (%)
Housewife	47	92.2
Honorary Worker	1	2.0
Private Sector	3	5.9
Total	51	100.0

Table 3 indicates that the majority of respondents were housewives, with 47 respondents (92.2%). Only a small proportion worked as honorary workers or in the private sector. This suggests that most mothers did not engage in formal employment outside the home.

Table 4. Distribution of Antenatal Care Visit Frequency

ANC Visit Frequency	Frequency (n)	Percentage (%)
Compliant (> 6 visits)	47	92.2
Non-compliant (< 6 visits)	4	7.8
Total	51	100.0

Table 4 shows that most respondents complied with the recommended frequency of Antenatal Care visits, with 47 respondents (92.2%) attending more than six visits during pregnancy. However, 4 respondents (7.8%) did not meet the recommended number of ANC visits.

Table 5. Distribution of Low Birth Weight Incidence

Birth Weight Outcome	Frequency (n)	Percentage (%)
Normal Birth Weight	44	86.3
Low Birth Weight (LBW)	7	13.7
Total	51	100.0

Table 5 indicates that most newborns had normal birth weight, accounting for 44 infants (86.3%). Nevertheless, Low Birth Weight was still observed in 7 infants (13.7%). This finding suggests that LBW remains present despite high compliance with ANC visits, indicating the need for further analysis of associated factors.

Bivariat Analyze

Bivariate analysis was conducted to examine the relationship between the frequency of Antenatal Care (ANC) visits and the incidence of Low Birth Weight (LBW). Since the data were not normally distributed and both variables were ordinal, the Spearman rank correlation test was applied with a significance level of 0.05.

Table 6. Relationship Between Frequency of Antenatal Care Visits and Low Birth Weight Incidence

Variables	Correlation Coefficient (r)	p-value	N
Frequency of ANC visits – LBW incidence	0.731	0.000	51

Based on Table 6, the Spearman correlation test showed a correlation coefficient (r) of 0.731 with a p-value of 0.000 ($p < 0.05$). This result indicates a statistically significant relationship between the frequency of Antenatal Care visits and the incidence of Low Birth Weight. The correlation coefficient value suggests a strong relationship between the two variables.

The positive direction of the correlation indicates that better compliance with Antenatal Care visit frequency is associated with improved birth weight outcomes. Conversely, mothers who were not compliant with the recommended frequency of ANC visits tended to have a higher incidence of Low Birth Weight.

These findings demonstrate that the frequency of Antenatal Care visits plays an important role in influencing birth weight outcomes. Therefore, improving maternal compliance with ANC visits may contribute to reducing the incidence of Low Birth Weight in the study area.

Discussion

The findings of this study demonstrate a statistically significant relationship between the frequency of Antenatal Care (ANC) visits and the incidence of Low Birth Weight (LBW) at Morodadi Public Health Center. The bivariate analysis using the Spearman correlation test showed a strong positive correlation ($r = 0.731$; $p < 0.05$), indicating that compliance with recommended ANC visits is closely associated with better birth weight outcomes. This result confirms the importance of antenatal care utilization as a key factor in preventing adverse neonatal outcomes, particularly low birth weight.

Low birth weight has long been recognized as a major contributor to neonatal morbidity and mortality and remains a persistent public health issue, especially in developing regions. Previous studies have consistently reported that infants born with low birth weight are more vulnerable to infections, delayed growth, impaired cognitive development, and increased risk of chronic diseases later in life (Putri et al., 2020). Therefore, identifying modifiable maternal

and healthcare-related factors associated with LBW is essential for improving neonatal health outcomes.

The results of this study are consistent with several previous studies that found a significant association between ANC visit frequency and birth weight. A study conducted by Ida Novia Rini et al., (2023) in low- and middle-income countries reported that mothers who attended an adequate number of antenatal visits had a significantly lower risk of delivering LBW infants compared to those with insufficient visits. Similarly, research by Maolida et al., (2024) in Indonesia showed that inadequate antenatal care was one of the strongest predictors of low birth weight and neonatal mortality.

Adequate ANC visits provide an opportunity for healthcare providers to monitor maternal health status, detect pregnancy-related complications, and implement timely interventions. During ANC visits, mothers receive nutritional counseling, supplementation, screening for anemia and infections, and monitoring of fetal growth. These services play a crucial role in preventing intrauterine growth restriction, which is a major cause of LBW (Sipayung et al., 2024). Mothers who do not comply with ANC recommendations may miss these critical interventions, thereby increasing the risk of delivering LBW infants.

Despite the high proportion of mothers who complied with ANC visits in this study, cases of LBW were still observed. This finding suggests that while the frequency of ANC visits is important, it may not be sufficient on its own to fully prevent LBW. Several studies have emphasized that the quality of antenatal care is equally important as the number of visits. According to research by Astuti & Astuti, (2025), poor-quality maternal health services can significantly reduce the effectiveness of healthcare utilization, even when coverage is high. Inadequate counseling, limited screening, and lack of individualized care may limit the potential benefits of ANC visits.

Maternal characteristics observed in this study may also have contributed to the occurrence of LBW. The univariate analysis showed that most respondents were under 20 years of age and had low to moderate educational levels. Previous studies have identified young maternal age as a significant risk factor for LBW due to biological immaturity, inadequate nutritional reserves, and limited health knowledge (Ruindungan, 2020; Sinta Maharani Hanifah et al., 2025). Younger mothers may also have lower autonomy in decision-making related to healthcare utilization and nutrition during pregnancy.

Maternal education plays a critical role in influencing health-seeking behavior and pregnancy outcomes. Mothers with higher educational attainment are more likely to understand health information, adhere to medical advice, and practice healthy behaviors during pregnancy.

A study by Rusly & Hidayat (2024) found that maternal education was significantly associated with both ANC utilization and birth weight outcomes. In the present study, the predominance of low educational levels among respondents may have reduced the effectiveness of ANC visits, as health education messages may not have been fully understood or applied.

Occupational status may also indirectly influence pregnancy outcomes through socioeconomic pathways. Most respondents in this study were housewives, which may reflect limited household income and reduced access to nutritious food. Several studies have reported that low socioeconomic status is associated with increased risk of LBW due to poor maternal nutrition, limited access to healthcare resources, and higher exposure to environmental stressors (Silaban et al., 2024). These factors may contribute to LBW even among mothers who attend ANC visits regularly.

The strong correlation observed in this study underscores the importance of promoting compliance with ANC visits as part of maternal health programs. However, it also highlights the need for comprehensive approaches that address not only healthcare utilization but also maternal education, nutrition, and social support. Previous research by Bhutta et al. (2013) emphasized that integrated maternal health interventions are more effective in improving birth outcomes than single-component strategies.

This study has several limitations that should be acknowledged. The cross-sectional design limits the ability to establish causal relationships between ANC visit frequency and LBW incidence. In addition, the use of secondary data restricted the analysis of other potential confounding variables such as maternal nutritional status, anemia, pregnancy complications, and lifestyle factors. Future studies employing longitudinal designs and multivariate analysis are recommended to better understand the complex interactions between ANC utilization and birth outcomes.

Despite these limitations, the findings of this study provide important evidence supporting the role of antenatal care in improving neonatal outcomes. The strong association between ANC visit frequency and LBW incidence suggests that strengthening ANC programs at the primary healthcare level could contribute to reducing the burden of LBW. Efforts should focus not only on increasing coverage but also on improving the quality and effectiveness of antenatal services.

In conclusion, this study demonstrates that the frequency of Antenatal Care visits is significantly associated with the incidence of Low Birth Weight. Mothers who complied with recommended ANC visits had better birth weight outcomes compared to those who were not compliant. These findings reinforce the importance of antenatal care as a key strategy for

preventing low birth weight and improving maternal and neonatal health outcomes. Enhancing ANC service quality, maternal education, and comprehensive support during pregnancy is essential to further reduce the incidence of LBW in the study area.

4. CONCLUSION

This study concludes that there is a significant relationship between the frequency of Antenatal Care (ANC) visits and the incidence of Low Birth Weight (LBW) at Morodadi Public Health Center. Mothers who complied with the recommended number of ANC visits were more likely to deliver infants with normal birth weight compared to those who were not compliant. These findings indicate that adequate utilization of antenatal care services plays an important role in improving birth outcomes and reducing the incidence of low birth weight.

Based on these findings, it is recommended that maternal health programs continue to strengthen efforts to improve both the coverage and quality of Antenatal Care services. Health workers should emphasize the importance of regular ANC visits while also ensuring effective counseling, early risk detection, and appropriate interventions during pregnancy. Future studies are recommended to explore additional factors influencing low birth weight using more comprehensive designs to support the development of targeted maternal and neonatal health interventions.

Acknowledgement. The heading should not be given a number and should instead be considered as a subsubsection heading.

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