
Maternal Age, Parity, And Hemoglobin Levels Associated With The Incidence Of Low Birth Weight

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Abstract

Low Birth Weight (LBW) is a health problem that contributes to high neonatal mortality rates. Factors thought to influence the incidence of LBW include maternal age, parity, and hemoglobin levels. This study aims to determine the relationship between maternal age, parity, and hemoglobin levels with the incidence of LBW at the Jimbaran 1 Sub-Health Center in 2025. This study used an analytical design with a cross-sectional approach, with a sample of 205 respondents selected using a simple random sampling technique. The data used were secondary data from a maternal cohort and analyzed using the Spearman Rank test. The results showed that most respondents were at a non-risk age (83.4%), had a non-risk parity (63.4%), and did not experience anemia (64.4%). The incidence of LBW was 13.7%. The analysis showed a significant relationship between maternal age and the incidence of LBW ($p=0.017$) and hemoglobin levels with the incidence of LBW ($p=0.003$). Meanwhile, parity did not have a significant relationship with the incidence of LBW ($p=0.682$). The conclusion of this study is that maternal age and hemoglobin levels are associated with the incidence of low birth weight (LBW). It is recommended that healthcare professionals increase efforts to prevent anemia and educate about healthy reproductive ages to reduce the incidence of low birth weight (LBW).

Keywords: Maternal Age, Parity, Hemoglobin, Low Birth Weight (LBW).

INTRODUCTION

Low Birth Weight (LBW) is a public health problem that remains a major cause of neonatal morbidity and mortality in various countries, including Indonesia. Babies are categorized as LBW if their birth weight is less than 2,500 grams, measured within the first hour after birth. Babies with LBW have a higher risk of growth disorders, developmental delays, infections, neonatal death, and long-term health complications (Fauziah et al., 2024). Therefore, preventing LBW is a focus of maternal and child health services.

The incidence of LBW is influenced by various maternal, fetal, and placental factors. Maternal factors are the most frequently identified determinants, including maternal age, parity, nutritional status, comorbidities, and hemoglobin levels during pregnancy (Jaya & Fauziah, 2021). Maternal age under 20 or over 35 is known to increase the risk of LBW due to immature or decreased reproductive organs, which impact fetal growth (Suwarni et al., 2012). Furthermore, parity that is too low or too high is also associated with an increased risk of low birth weight (LBW) due to suboptimal reproductive adaptation or decreased uterine function after repeated pregnancies (Fatmawati et al., 2021).

Another important factor is maternal hemoglobin levels during pregnancy. Hemoglobin transports oxygen and nutrients to body tissues, including the placenta and fetus. Decreased hemoglobin levels cause anemia, which can disrupt oxygen transport, thus inhibiting fetal growth and increasing the risk of low birth weight (Rohani et al., 2023). Research by Widiанти and Fitriahadi (2023) showed a significant association between anemia in pregnant women and the incidence of low birth weight ($p<0.05$), while research by Wahyuni et al. (2021) also reported that maternal age, a risk factor, was significantly associated with the incidence of low birth weight. However, research findings on the relationship between parity and low birth weight are inconsistent. Jumhati and Novianti (2018) found a relationship between parity and low birth weight, while Izhara, Lestari, and Ayuningrum (2025) reported no significant association. The differences in research results indicate that risk factors for LBW still need to be studied across various population characteristics and health service areas.

In Bali Province, LBW and prematurity are the leading causes of neonatal mortality, accounting for 24.8% in 2024 (Bali Provincial Health Office, 2024). In Badung Regency, the incidence of LBW increased from 3.6% in 2023 to 4.7% in 2024. A higher increase also occurred in the Jimbaran 1 Community Health Center (Puskesmas Pembantu Jimbaran 1) coverage area, from 7.5% in 2023 to 9.6% in 2024 and again to 13.6% in 2025. Local data shows that LBW is most common in mothers with anemia (38.6%), at-risk age (13%), and at-risk parity (7.2%).

The increasing incidence of LBW in the working area of Jimbaran 1 Sub-Health Center and the continuing discrepancies in research results regarding factors related to LBW indicate the need for further research. This study aims to analyze the relationship between maternal age, parity, and hemoglobin levels with the incidence of Low Birth Weight (LBW) in the working area of Jimbaran 1 Sub-Health Center in 2025. The results of the study are expected to be a basis for improving efforts to detect risk factors early during pregnancy so that the incidence of LBW can be prevented through more optimal antenatal care.

RESEARCH METHODS

This study was a quantitative, observational, analytical design using a cross-sectional approach. It was conducted in the Jimbaran 1 Sub-District Health Center (Puskesmas Pembantu Jimbaran 1), Badung Regency, Bali, with data collected in March 2026 using medical records of mothers who gave birth during 2025.

The study population consisted of all 420 mothers who gave birth in the Jimbaran 1 Sub-District Health Center (Puskesmas Pembantu Jimbaran 1) in 2025. The study sample consisted of 205 respondents, selected using random sampling based on established inclusion and exclusion criteria. Inclusion criteria included pregnant women with a gestational age of ≥ 20 weeks and complete medical records regarding maternal age, parity, hemoglobin level, and birth weight. Respondents with incomplete medical records were excluded from the study.

The independent variables in this study were maternal age, parity, and hemoglobin level, while the dependent variable was the incidence of Low Birth Weight (LBW). Maternal age was categorized as at-risk (< 20 years or > 35 years) and not at risk (20–35 years). Parity was classified as at-risk (parity 0 or ≥ 4) and not at risk (parity 1–3). Hemoglobin levels were categorized as anemic (Hb < 11 g/dL) and not anemic (Hb ≥ 11 g/dL). Low birth weight (LBW) was defined as a birth weight of less than 2,500 grams.

The study data were secondary data obtained from a maternal cohort and medical records at the Jimbaran 1 Sub-District Health Center. Data collection used a checklist arranged according to the research variables. The collected data underwent editing, coding, tabulation, entry, and cleaning before being analyzed using SPSS software.

Data analysis was performed univariately to describe the frequency distribution of each variable, while bivariate analysis used the Spearman Rank correlation test to determine the relationship between maternal age, parity, and hemoglobin levels with the incidence of LBW. A p-value < 0.05 is considered statistically significant. This study obtained ethical approval from the Denpasar Polytechnic of Health Ethics Commission prior to implementation.

RESULTS AND DISCUSSION

Table 1. Characteristics of Research Respondents

Category	Frequency	Percentage
Age		
Not at Risk (20-35 years)	171	83,4
At Risk (<20 or >35 years)	34	16,6
Parity		
No Risk (1-3)	194	94,6
Risky (0 or >4)	11	5,4
Hemoglobin		
No Anemia	132	64,4
Anemia	73	35,6
BBLR		
No BBLR	177	86,3
BBLR	28	13,7

Most respondents were in the healthy reproductive age group (20–35 years), had a non-risk parity, and did not have anemia. Despite this, low birth weight (LBW) was still found in some newborns, indicating that low birth weight remains a health issue requiring attention. This situation highlights the importance of early detection of risk factors during pregnancy through comprehensive antenatal care.

Table 2. Relationship between Maternal Age and the Incidence of Low Birth Weight (LBW)

Variable	p-value	Correlation Coefficient
mother's age	0,017	0,166

Analysis shows that maternal age is associated with the incidence of low birth weight (LBW). Mothers who become pregnant at age less than 20 or older than 35 tend to have a greater risk of giving birth to babies with low birth weight compared to those of healthy reproductive age. Biologically, pregnancy at too young an age is associated with suboptimal reproductive organ development, while at an older age there is a decline in reproductive function and placental perfusion, which can inhibit fetal growth. These findings align with research by Wahyuni et al. (2021) and Wulandari (2024), which reported that maternal age is a significant determinant of the incidence of low birth weight (LBW).

Table 3. Relationship between Parity and the Incidence of Low Birth Weight (LBW)

Variable	p-value	Correlation Coefficient
parity	0,024	0,157

Parity is also associated with low birth weight (LBW). Mothers with parity levels that are too low or too high are more likely to give birth to low birth weight babies. In primiparas, this condition may be related to a lack of experience in caring for pregnancies, while in grandemultiparas, decreased uterine elasticity and endometrial vascularization can affect fetal growth. The results of this study support the research of Jumhati and Novianti (2018), but differ from the research of Izhara, Lestari, and Ayuningrum (2025), which found no association between parity and low birth weight babies. This difference is likely influenced by respondent characteristics, sample size, and variations in other risk factors at each study location.

Table 4. Relationship between Hemoglobin Levels and the Incidence of Low Birth Weight (LBW)

Variable	p-value	Correlation Coefficient
Hemoglobin levels	0,003	0,209

Hemoglobin levels showed a correlation with the incidence of low birth weight (LBW) and were the factor with the strongest correlation compared to other variables in this study. Mothers with anemia are at higher risk of delivering low birth weight babies due to the reduced blood capacity to transport oxygen and nutrients to the placenta, resulting in stunted fetal growth. This finding aligns with research by Widiанти and Fitriahadi (2023) which found that anemia during pregnancy is correlated with the incidence of low birth weight. Therefore, anemia prevention efforts through hemoglobin level monitoring, iron supplementation, nutritional education, and adherence to antenatal checkups need to be continuously improved as part of a strategy to reduce the incidence of low birth weight (LBW).

CONCLUSIONS

Maternal age, parity, and hemoglobin level were found to be associated with the occurrence of low birth weight in the study area. Mothers with high-risk reproductive age, high-risk parity, and anemia during pregnancy were more likely to deliver infants with low birth weight. Among these factors, maternal hemoglobin level appeared to have the strongest association with low birth weight, emphasizing the importance of preventing and managing anemia during pregnancy. These findings highlight the need to strengthen antenatal care through early identification of maternal risk factors, routine hemoglobin screening, nutritional counseling, and appropriate interventions to reduce the incidence of low birth weight and improve maternal and neonatal health outcomes.

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