# MATERNAL KNOWLEDGE, ATTITUDES, AND AGE IN RELATION TO LOW BIRTH WEIGHT RISK: EVIDENCE FROM PRIMARY HEALTH CENTERS IN BATU AMPAR DISTRICT, TANAH LAUT REGENCY

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**Abstract**

**Background**: Low Birth Weight (LBW) is one of the important indicators of infant health that contributes to the increase in neonatal morbidity and mortality. Factors that affect the incidence of LBW include the mother's knowledge, attitude, and age during pregnancy. **Objective:** This study aims to determine the relationship between knowledge, attitudes, and maternal age to the incidence of LBW in the working area of the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District in 2025. **Methods**: This study used an observational analytical design with *a cross-sectional approach*. The study population was all mothers who gave birth in the working area of the two health centers with a sample of 115 people selected in total sampling. Data were collected through questionnaires and analyzed using *the Fisher Exact* test with a significance rate of 95% ($\alpha = 0.05$). **Results**: The results showed that there was a significant relationship between maternal knowledge and the incidence of LBW ($p = 0.002$) and between maternal attitudes and the incidence of LBW ($p < 0.001$). Meanwhile, there was no significant relationship between maternal age and LBW incidence ($p = 0.525$). **Conclusion:** Knowledge and attitudes of pregnant women have an important role in preventing the occurrence of LBW, while the age of the mother in this study did not show a meaningful relationship. It is recommended to health workers to improve education and coaching of pregnant women to strengthen knowledge and positive attitudes during pregnancy.

**Keywords:** Attitude, Health Center, Knowledge, LBW, Mother's Age

## Background

Low Birth Weight (LBW) is defined as a baby weighing less than 2500 grams measured within one hour after birth regardless of gestational age. Due to the imperfect level of maturation and weak organ systems, LBW can be at risk of impaired growth and development and even death (Fauziah et al., 2024). LBW continues to receive special attention in various countries, especially developing countries and countries with low socioeconomic conditions. WHO also said that 60-80% of the Infant Mortality Rate (AKB) that occurred was caused by LBW (R. Marlina & Idealistiana, 2024).

Based on a WHO report, every year, more than 20 million LBW babies are born and more than 96% of them occur in developing countries (WHO, 2023). LBW is influenced by several factors, namely pregnancy factors, maternal factors, and fetal factors. Maternal factors include malnutrition during pregnancy, maternal age, maternal knowledge and attitude during pregnancy, pregnancy distance that is too close, and diseases suffered by mothers (Apriyanti et al., 2021). Meanwhile, fetal factors that can affect LBW include congenital abnormalities and infections at birth, other risk factors such as parity, economic status, education, and employment (Fauziah et al., 2024).

Indonesia is ranked fifth in the world for Prematurity and the prevalence of LBW by 7.1%. The total percentage of LBW in South Kalimantan in 2023 is 6.8% and the percentage of LBW babies in Tanah Laut Regency in 2024 is 6.7%. Based on data from the Tanah Laut Health Office, the sub-district with the highest percentage of LBW babies is in Batu Ampar District in 2023 with a percentage of 8.9% and

an increase in 2024 with a percentage of 13.31% (Ayu et al., 2022).

In 2024 at the Tajau Pecah Health Center, there will be 1 pregnant woman between the ages of 15 and 19 years, 1 pregnant woman over the age of 35 years and at the Durian Bungkuk Health Center there will be 3 pregnant women over the age of 35. Meanwhile, in 2025 there will be 2 pregnant women aged 15 to 19 years and 2 pregnant women over the age of 35 at the Durian Bungkuk Health Center, 2 pregnant women over the age of 35 at the Tajau Pecah Health Center. Based on this data, Batu Ampar District as one of the primary health service areas through the Tajau Pecah Health Center and the Durian Bungkuk Health Center, still faces serious challenges related to the incidence of Low Birth Weight Infants (LBW). The annual data of the two health centers shows that LBW cases have still occurred consistently in recent years, which reflects problems in factors that affect maternal health during pregnancy (Arinta et al., 2025) ; (Nurbaniwati et al., 2023).

Behavioral frameworks such as Health Belief Model (HBM)) and Theory of Planned Behavior (TPB) It is very relevant to explain the relationship between knowledge and attitudes to health outcomes of pregnant women. (Marisa & Ayuningsih, 2024). HBM states that behavior is influenced by the perception of vulnerability (perceived susceptibility), perception of severity (perceived severity), perception of benefits, and barriers. Knowledge increases risk perception, and attitude determines readiness to act. TPB emphasizes that attitudes, subjective norms, and behavioral control affect the mother's intentions and actions in maintaining pregnancy. In the context of LBW, these theories explain that: Knowledge increases the perception of LBW risk, attitudes shape maternal readiness to follow preventive behaviors and age Are predisposing factors that influence physiological and behavioral responses (Marisa & Ayuningsih, 2024). This framework strengthens the scientific argument that the three independent variables are logically and theoretically related to the occurrence of LBW.

The urgency of this research lies in the need to identify factors that can be controlled to prevent the occurrence of LBW, especially the maternal knowledge and attitude factor during pregnancy and maternal age as biological factors. Mothers with low knowledge are less likely to understand the importance of nutrition, routine pregnancy control, and early detection of pregnancy complications (Azizah et al., 2024). Similarly, a less supportive attitude towards medical advice can increase the risk of babies being born with low body weight. Through this study, it is hoped that a clear picture can be obtained of the relationship between knowledge, attitudes, and age of mothers and the incidence of LBW in Batu Ampar District.

**Method**
**Research Design**
This study uses a quantitative method with an observational analytical study design Cross-sectional type. This approach was chosen because the researcher wanted to find out the relationship between the independent variable (knowledge, attitude, and maternal age) and the bound variable (LBW occurrence) at one observation time without intervention. Design Cross-sectional Allows for fast, efficient, and suitable data collection to assess maternal and infant health determinants (R. Marlina & Idealistiana, 2024) ; (Apriyanti et al., 2021). The quantitative approach is used because the research variables are measured using structured instruments, with results in the form of numbers that can be statistically analyzed to assess the significance of the relationship.

**Population and Sample**
The study included all mothers who gave birth in the working area of the Tajau Pecah Health Center and the Durian Bungkuk Health Center mothers who had given birth from the period of January - May 2025, as many as 115 people with a sampling technique using total sampling (R. Marlina & Idealistiana, 2024).

**Variable Operational Definition**
An explanation of how a variable in this study is defined, measured, and interpreted practically and how to obtain the data (Table 1) (R. Marlina & Idealistiana, 2024).

**Data Analysis Methods**
*Univariate Analysis*
Univariate analysis was carried out to describe all research variables, both independent and bound, separately by creating a frequency distribution table (Apriyanti et al., 2021). Univariate analysis in this study included the

Table 1. Operational Variables and Definitions

| No | Variable | Definition Operational | Parameters | Measuring Instruments | Scale | Score |
|---|---|---|---|---|---|---|
| 1 | LBW Incident | Babies born with a weight of < 2500gr | Baby's weight at birth | KIA Book/Medical Records | Ordinal | 1 = LBW (weight less than 2500gr) 2 = No LBW (body weight more than 2500gr) |
| 2 | Knowledge | The mother's level of understanding of LBW, including definition, risk factors, and prevention. | 1. Definition of LBW 2. Causes 3. Prevention 4. Risks | Multiple-choice questionnaire | Ordinal | Good = 76-100% correct answer (score: 9-11) Medium = 56-75% correct answer (score: 6-8) Less Good = 40-55% of correct answers (score: 4-5) |
| 3 | Attitude | The mother's positive or negative response to efforts to maintain pregnancy so that the baby does not have LBW. | 1. ANC Compliance 2. Diet 3. Rest 4. Response to medical advice | 4-point Likert scale questionnaire | Ordinal | Scores per item: 1–4Total scores categorized:• ≥75% = Good Attitude• <75% = Poor attitude |
| 4 | Mother's Age | The age of the mother during pregnancy | Age in years | Personal data / KIA book / Medical Records | Nominal | 1 = 20 - 35 Years (low risk) 2 = <20 years and >35 years (high risk) |

incidence of LBW, knowledge, attitudes, and age of the mother.

***Bivariate Analysis***
Bivariate analysis explains the relationship between the independent variables, namely knowledge, attitude, and age of the mother and the bound variable, namely the incidence of LBW using the test Chi-Square with a significance (α) of 5% (95% confidence degree). On tests Chi-Square the number of observations is too little, the expected frequency is less than 5 (table 2x2) and more than 20% (table 2xK). Then the analysis uses the Fisher exactly. Test Fisher Exact It is done by combining a 2x3 table or a 3x3 table into a 2x2 table. When the results of the statistical test with p-value < α=0.05, So it is said that there is a relationship between the two variables (Apriyanti et al., 2021).

**Results and Discussion**
**Results**
The results of this study are presented in the form of frequency distribution, univariate analysis and bivariate analysis.
**Respondent Characteristics**
The last education of the respondents can be seen from the following Table 2:

Table 2. Characteristics of Last Education

| Last Education | F | % |
|---|---|---|
| SD/Elementary School | 23 | 20 |
| Junior High School | 32 | 27.8 |
| High School | 47 | 40.9 |
| DIPLOMA/S1 | 13 | 11.3 |
| Total | 115 | 100 |

Based on the results of the study on 115 respondents who were mothers who had given birth at the Tafar Pecah Health Center and the Durian Bungkuk Health Center from January to

May, the distribution of the frequency of respondents based on the last education was 40.9% high school graduates, and the lowest Diploma/S1 was 13 people (11.3%).

## Univariate Analysis Results
### *LBW Occurrence Variables*
The frequency distribution of Low Birth Weight Babies (LBW) of respondents can be seen from the following Table 3:

Table 3. Low Birth Weight Infant Variable (LBW)

| Birth Weight | F | % |
|---|---|---|
| Low Birth Weight Infants (LBW) | 16 | 13.9 |
| Non Low Birth Weight Babies (Non LBW) | 99 | 86.1 |
| Total | 115 | 100 |

Source : Primary data processed, 2025

The results of the study on 115 respondents were mothers who had given birth at the Tajau Pecah Health Center and the Durian Bungkuk Health Center from January to May 2025, the sample distribution based on the Birth Weight of the most babies was non-LBW babies as much as 86.1%. However, LBW babies in January-May 2025 are still relatively high, namely 16 people (13.9%) when compared to national standards. According to Riskesdas 2018 data, the prevalence of LBW nationally is around 6.2%, and according to WHO, the LBW rate that is still considered acceptable is below 10%. The findings in this study show that the LBW rate in the working area of the Tajau Pecah and Durian Bungkuk Health Center is higher than the national and global averages, so it needs to be a special concern.

### *Knowledge Variables*
The frequency distribution of respondents' knowledge can be seen from the following Table 4:

Table 4. Knowledge Variables

| Knowledge | F | % |
|---|---|---|
| Good-Medium Knowledge Level | 103 | 89.6 |
| Lack of Knowledge Level | 12 | 10.4 |
| Total | 115 | 100 |

Source : Primary data processed, 2025

Based on the results of the univariate analysis, it is known that most of the respondents have a good to moderate level of knowledge, namely 103 people (89.6%), while respondents with less knowledge amount to 12 people (10.4%). These results show that the majority of pregnant women have a good to moderate level of knowledge.

### *Attitude Variables*
The frequency distribution of respondents' attitudes can be seen in the following Table 5:

Table 5. Attitude Variables

| Attitude | F | % |
|---|---|---|
| Kindness | 108 | 93.9 |
| Lack of Attitude | 7 | 6.1 |
| Total | 115 | 100 |

Source : Primary data processed, 2025

The results of the analysis showed that most mothers had a good attitude towards pregnancy 108 people (93.9%), and only 7 people (6.1%) had a poor attitude. In this context, the attitude of the mother reflects the willingness and willingness to take good care of the pregnancy. Good attitudes include compliance with the recommendations of health workers, awareness to carry out routine pregnancy checkups, and attention to nutrition and adequate rest.

### *Age Variables*
The distribution of variable frequencies of age can be seen in the following Table 6:

Table 6. Variable Age

| Age | F | % |
|---|---|---|
| 20 years – 35 years | 88 | 76.5 |
| < 20 years old or > 35 years old | 27 | 23.5 |
| Total | 115 | 100 |

Source : Primary data processed, 2025

The results of the study on 115 respondents were mothers who had given birth at the Tajau Pecah Health Center and the Durian Bungkuk Health Center from January to May 2025, at most 25-35 years old (76.5%) showed the recommended age to get pregnant.

## Bivariate Analysis Results
### *The Relationship of Knowledge with the Occurrence of LBW*
Analysis of knowledge ridges with LBW occurrences is as follows Table 7:

Table 7. The Relationship Between Knowledge and The Occurrence of LBW

| Baby's Birth Weight | Knowledge | | | | | | Significance (P) |
| | High-Medium | | Less | | Total | | |
| | F | % | F | % | F | % | |
| LBW | 10 | 62.5 | 6 | 37.5 | 16 | 100 | |
| Non-LBW | 93 | 93.9 | 6 | 6.1 | 99 | 100 | 0.002 |
| Total | 103 | 89.6 | 12 | 10.4 | 115 | 100 | |

Source : Primary data processed, 2025

Table 8. The Relationship Between Attitudes and LBW Incidents

| Baby's Birth Weight | Attitude | | | | | | Significance (P) |
| | Good | | Less | | Total | | |
| | F | % | F | % | F | % | |
| LBW | 9 | 56.3 | 7 | 43.8 | 16 | 100 | |
| Non-LBW | 99 | 100 | 0 | 0 | 99 | 100 | 0.001 |
| Total | 108 | 93.9 | 7 | 6.1 | 115 | 100 | |

Source : Primary data processed, 2025

Table 9. Age Relationship with LBW Incidence

| Baby's Birth Weight | Age | | | | | | Significance (P) |
| | Low Risk | | High Risk | | Total | | |
| | F | % | F | % | F | % | |
| LBW | 11 | 68.8 | 5 | 31.2 | 16 | 100 | |
| Non-LBW | 77 | 77.8 | 22 | 22.2 | 99 | 100 | 0.525 |
| Total | 88 | 76.5 | 27 | 23.5 | 115 | 100 | |

Source : Primary data processed, 2025

The results of the analysis of *the Fisher Exact* test showed a relationship between knowledge and the incidence of LBW at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District with a significance value (p) = 0.002 smaller than ($\alpha$ = 0.05).

***The Relationship Between Attitudes and LBW Incidents***
Analysis of attitudes with the occurrence of LBW is as follows Table 8. The results of the analysis of *the Fisher Exact* test showed a relationship between attitude and the incidence of LBW at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District with a significance value (p) = 0.001 smaller than ($\alpha$ = 0.05).

***Age Relationship with LBW Incidence***
Analysis of the relationship between age and LBW incidence is as follows Table 9. The results of the analysis of *the Fisher Exact* test showed no relationship between maternal age and the incidence of LBW at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District with a significance value (p) = 0.525 greater than ($\alpha$ = 0.05).

**Discussion**
H1 : There is a significant relationship between knowledge (X1) and the incidence of LBW (Y) at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District, meaning that the first hypothesis (H1) is accepted with test calculations Fisher Exact shows that the significant value of the knowledge variable is 0.002 less than ($\alpha$ = 0.05). Out of 16 total LBW cases, as many as 6 cases (37.5%) came from mothers with low knowledge, while the rest (62.5%) from mothers with high/medium knowledge. On the other hand, the majority of mothers with high knowledge/moderate birth of non-LBW babies (93.9%).

In line with the research of Sri Ratna Ningsih et al (2016) that there is a significant relationship between maternal knowledge and

LBW baby care at Wates Hospital with a p value of 0.000 (Ningsih et al., 2016). Because, the older you are, the more mature a person will be in thinking and working (Abidin et al., 2024).

H2: There is a significant relationship between attitude (X2) and the incidence of LBW (Y) at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District, this states that the second hypothesis (H2) is accepted with the test Fisher Exact shows that the significant value for the attitude variable is = 0.001 less than (α = 0.05). As many as 43.8% of mothers with a poor attitude, gave birth to LBW babies while there was not a single mother with a good attitude who gave birth to LBW babies.

This is supported by research from Rina Sulastri (2022) that there is a relationship between maternal attitudes during pregnancy and the incidence of LBW with a p value = 0.016 (OR=3,750; 95% CI=1,379-10,200). If the mother has a good knowledge of topics related to her needs during pregnancy, then the mother can maintain a positive attitude and engage in positive activities (Sulastri, 2022).

H3: There was no relationship between age (X3) and the incidence of LBW (Y) at the Tajau Pecah Health Center and the Durian Bungkuk Health Center, Batu Ampar District, this states that the third hypothesis (H3) was rejected by the test Fisher Exact Significant Value The age variable is = 0.525 greater than (α = 0.05). Both high- and low-risk ages have statistically different distributions of LBW incidence. This is in line with the research of Teri Marlina and Mastiana (2024) that there is no relationship between the mother's age and the incidence of LBW at Raden Mattaher Hospital, Jambi Province with the value of p-value 0,224 (T. Marlina & Mastina, 2021).

Similarly, the research results of Jakub Staniczek et al. (2024) p-value = 0.252, that there was no significant association between the age of the young mother (≤ 20 years) and the incidence of fetal anomalies, meaning that the age of the young mother did not increase the risk of anomalies congenital in the fetus compared to the overall population.(Staniczek et al., 2024) However, several other studies have shown that there is a relationship between age and the incidence of LBW, as the results of the research of Rina Marlina and Lia Idealistiana (2024) show that the

value of p-value 0.000 means that there is a meaningful relationship between the mother's age and LBW. Because mothers under the age of 20 and over 35 years are at high risk of pregnancy and childbirth. Mothers under 20 years old may not be ready to get pregnant due to imperfect body anatomy, while women over 35 years old experience degeneration that increases the risk of pregnancy and childbirth complications resulting in perinatal death (R. Marlina & Idealistiana, 2024).

**Conclusion**
There was a significant relationship between the mother's level of knowledge and the incidence of LBW. Mothers with low knowledge are more at risk of giving birth to babies with low birth weight than mothers with high or moderate knowledge

There is a very significant relationship between the attitude of pregnant women and the incidence of LBW. Mothers with a less attitude towards pregnancy showed a higher proportion of LBW events than mothers with a good attitude.

There was no significant relationship between maternal age and the incidence of LBW. Although descriptively there are cases of LBW in mothers of high-risk age, statistically age does not have a significant effect on the incidence of LBW.

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