

Original Research Report

## Determinants of Low Birth Weight Newborns in Indonesia: Literature Review

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**Abstract:** Low Birth Weight (LBW) is a health problem that requires special attention in various countries, especially in developing countries with low socio-economic conditions. LBW has a greater risk of experiencing morbidity and mortality than babies born with normal weight. Factors that affect of LBW are teenage pregnancy, preeclampsia, anemia, and ANC visits. LBW is also one of the factors that can cause babies to die before reaching the age of 1 year. The purpose of this systematic literature review is to analyze the relationship between maternal age, preeclampsia, anemia, and ANC visits to determine the cause of LBW so that it can suppress IMR. Using the Critical Appraisal Skills Program (CASP) method with data sources obtained from PubMed, Google Scholar, and Research Gate, there are 145 articles reviewed. Inclusion criteria are Teenage Pregnancy, Infant, Incidence of LBW, Factors influencing the incidence of LBW; article in full text and was published from 2017 to 2021; and national journals. There are five articles that meet the inclusion criteria. The results of this literature review are the factors that affect LBW, namely Teen Pregnancy, Preeclampsia, Anemia, and ANC visits.

**Keywords:** Critical Appraisal Skills Program, Infant Mortality Rate, Low Birth Weight.



## 1. Introduction

Low Body Weight (LBW) is a health problem that requires special attention in various countries, especially in developing countries with low socio-economic conditions. Babies can be categorized as babies who have low body weight if the baby weighs 2500 grams [1]. WHO classifies LBW into 3 types, namely LBW (1500–2499 grams), LBW (1000-1499 grams), LBW (<1000 grams). According to WHO 60-80% Infant Mortality Rate (IMR) can also be caused because the baby is born LBW. Low birth weight babies have a greater risk of experiencing morbidity and mortality than babies born with normal weight [2].

Babies born with low weight will be susceptible to disease until adulthood, tend to experience cognitive development disorders, mental retardation, immunological immaturity, difficulty breathing, gastrointestinal and nutritional disorders, liver and kidney immaturity, neurovascular and hematological disorders, as well as metabolic disorders and will more susceptible to infections that can result in death or even death [3].

Based on IDHS data, the incidence of LBW in Indonesia in 2017 was still relatively high at 7.1%. Babies born with low birth weight will experience higher mortality, growth and development delays during childhood compared to babies who are not LBW. An indicator of a country's success in improving public health is by decreasing the Infant Mortality Rate (IMR). IMR is a baby who dies before reaching the age of 1 year which can be expressed in 1,000 live births in the same year. One of the causes of IMR is babies born with low body weight (LBW). According to the 2017 IDHS, the IMR in Indonesia is 24 per 1000 live births. The SDGs have a target to reduce the IMR in 2030 by 12 per 1,000 live births [4].

Factors that affect low birth weight (LBW) are teenage pregnancy, pregnancy that occurs in adolescents aged 14-20 years will provide a high risk of maternal and child mortality, this is because teenage pregnancy causes bleeding during pregnancy. Several literatures show an increase in the proportion of teenage pregnancies due to lack of understanding or knowledge about sexuality, poor socioeconomic, negative peer influence6 sociodemographic factors, relationships between families, development, status, needs for attention, and illegal drugs [5]. One of the factors that can cause babies to be born with low LBW weight is severe preeclampsia in pregnancy, hypertension during pregnancy will cause disturbances in the cardiovascular system in pregnant women who are adapting to their pregnancy. This situation will reduce uteroplacental blood flow and supply to the fetus, resulting in LBW [6]. LBW can also be affected by anemia status in pregnant women. Anemia is a global problem and iron deficiency is the most common cause. In pregnancy, anemia increases the risk of adverse maternal, fetal and neonatal outcomes [7]. Anemia in pregnant women has an impact on nutritional disturbances and uteroplacental oxygenation. This will lead to impaired growth of the products of conception, immaturity, prematurity, congenital defects, or the fetus is born with low birth weight [8]. Anemia in pregnant women can also be influenced by regular antenatal care or ANC. ANC examination can reduce MMR and improve the health status of pregnant women. ANC examination in pregnant women is less than 4 times, there will be a risk of 1.15 times giving birth to LBW [8] [9].

Based on the above background, the authors are interested in discussing the literature review on the analysis of maternal relationships, preeclampsia, anemia, and ANC visits so that the results of the literature review research can be analyzed and taken into consideration for the preparation of planning programs and policy making in the future to prevent the occurrence of LBW can suppress IMR in Indonesia.

## 2. Literature Review

According to the research "Risk Factors for the Occurrence of Low Birth Weight (LBW) at the Lakipadada Hospital, Tana Toraja Regency" [10], it shows that the results of the study found that of the five risk variables for the incidence of LBW, the variables (anemia OR = 1.294,  $p = 0.005$ , frequency of ANC visits OR= 2.715,  $p=0.000$ , proven to be at risk for LBW. This study is not in line with research conducted with the title "Factors Related to the Event of Low Birth Weight (LBW) in Kudus District" [11] which stated that there was no relationship between anemia and low birth weight ( $p = 0.107$ ; 95% CI = 0.749 to 12.320; OR = 3.037). Indirect effects on mother and baby are infant mortality, increased susceptibility to infection and increased risk of infection, possibly premature birth.

According to research with the title "Relationship of Preeclampsia Mother with LBW Incidence at Balung Hospital, Jember Regency" [12], it shows that there is a relationship between preeclampsia mother and LBW (Low Birth Weight). And mothers who have preeclampsia have 1.85 times more

likely to give birth to LBW compared to mothers who do not have preeclampsia. This study is similar to the research conducted by [13] with the title "Study of Preeclampsia Risk Factors on Low Birth Weight (LBW)", which states that there is a relationship between preeclampsia and LBW incidence ( $p = 0.000$ ;  $r = 0.46$ ). In addition, the risk of the incidence of LBW infants in severe preeclampsia was higher than with mild preeclampsia ( $OR=11.5$ ). Which means a history of preeclampsia in pregnant women will affect the increase in the incidence of LBW babies. In addition, pregnant women with severe preeclampsia are 11.5 times more likely to give birth to LBW babies than those with mild preeclampsia.

According to research [11] with the title "Factors Related to the Event of Low Birth Weight (LBW) in Kudus District" shows that the percentage of mothers aged 35 years who gave birth to LBW babies (40.9%) is greater than those aged 35 years who gave birth to babies with normal weight (20.5%). This study is in line with research conducted by [1] with the title "Analysis of The Relationship of Maternal Age and Pregnancy Distance with The Event of Low Birth Weight (LBW) Infants in Panembahan Hospital" ( $OR\ 1.745$ ) and there is a relationship between gestational distance and the incidence of LBW ( $p$ -value 0.025,  $OR\ 2.187$ ).

According to a study with the title "The Relationship of Antenatal Care with the Incidence of Birth Weight Babies in Term Mothers at Dr. RSUP. M. Djamil Padang" [14], showed that mothers who gave birth to LBW had fewer complete ANC's than mothers who gave birth to normal babies ( $p = 0.026$ ;  $OR = 3.692$ ). This study is in line with research conducted by [10] with the title "Risk Factors for the Incidence of Low Birth Weight Babies (LBW) in Lakipadada Hospital, Tana Toraja Regency", showing that the results of the study found five risk variables for the incidence of LBW, the variables (anemia)  $OR = 1.294$ ,  $p = 0.005$ , frequency of ANC visits  $OR = 2.715$ , which means the number of frequency of ANC visits is the most influential factor on the incidence of LBW.

### 3. Methods

In accordance with the objectives and research questions, the literature used in this study was obtained through a systematic search system (Systematic Literature Search). The determinants of Low Birth Weight newborns in Indonesia will be reviewed including the sampling method, the variables contained in the journal taken, and the results of the study. The literature search method in this study began in the period 2017 to 2021, identified using electronic databases from PubMed, Google Scholar, Research Gate, and article screening was carried out independently by researchers following the requirements in fulfilling the inclusion criteria.

Table. 1 Inclusion criteria

Type	Inclusion
Research type	Quantitative Studies
Respondent type	Teen Pregnancy, baby
Intervention type	LBW incident
Type of results measured	Factors that influence the incidence of LBW
Other	Literature for 2017-2021

In the search for articles, 145 articles were identified, after filtering titles, abstracts, research methods, 46 articles were obtained to be taken and reviewed independently based on inclusion criteria. Then, further article screening was carried out to find appropriate and complete references regarding Determinants of Low Birth Weight Newborns in Indonesia, 5 articles were obtained for critical appraisal using the Joana Briggs Institute (JBI) then 5 articles were obtained for final review.

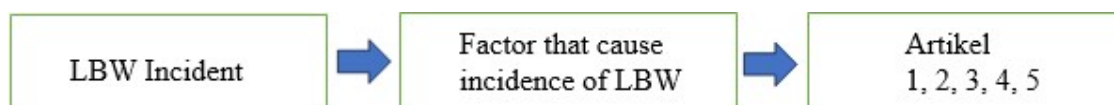


Figure 1. Data Extracted from Systematic Literature Review Articles

Figure 2 shows the results of a literature review search in several journals.

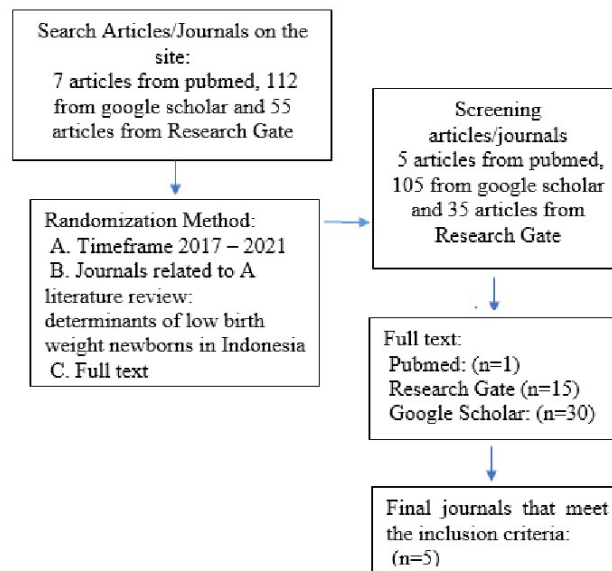


Figure 2. Flow Chard Sintesa Systematic Literature Review

#### 4. Result and Discussion

The results of a systematic literature review study found that pregnant women with anemia, preeclampsia, and early pregnancy can cause low birth weight.

##### 4.1. Relationship between Anemia and LBW

Based on the findings obtained in the study [10] anemia is able to reduce oxygen supply to the mother's body metabolism due to a lack of hemoglobin levels to bind oxygen which can cause indirect effects on mother and baby, namely infant mortality, increased maternal susceptibility to infection and increased risk of infection possibility of premature birth. Pregnant women with anemia 1,294 are at risk of giving birth to LBW. This is in accordance with the researcher's assumption that anemia in pregnancy has an adverse effect on the mother, both during pregnancy, childbirth and during the puerperium, especially in babies born, namely the occurrence of LBW.

##### 4.2. Relationship of Preeclampsia with LBW

Based on the findings obtained in the study [11] showed that mothers who had preeclampsia had 1.85 times the possibility of giving birth to low birth weight compared to mothers who did not experience preeclampsia. This study is in line with research [12] which states that severe preeclampsia has a higher risk of having a low birth weight baby compared to mild preeclampsia. Pregnant women with severe preeclampsia have a risk of giving birth to LBW babies up to 11.5 times more than pregnant women with a history of mild preeclampsia.

##### 4.3. Relationship between Early Pregnancy and LBW

Based on the findings obtained in the study [13] showed that the percentage of mothers aged 35 years who gave birth to LBW babies (40.9%) was greater than those aged 35 years who gave birth to babies with normal weight (20.5 %). This study is in line with research conducted [1] Pregnancy at the age of <20/>35 years causes a lack of adequate nutritional intake for fetal growth so that it can cause babies with low birth weight this is because at the age of <20 years the female reproductive organs immature and immature as well as psychologically pregnant women so that it has an impact on the less than optimal growth of the fetus in the mother's womb. Meanwhile, at the age of >35 years, the reproductive organs are no longer optimal for fetal growth. This is reinforced by the theory by Maryunani that mothers aged 35 years have organ functions and their health begins to decline so that they are likely to experience bleeding and prolonged labor, even babies born with low birth weight. Mothers with high-risk age need more energy, especially high-risk mothers who are carrying a fetus

need more additional energy. The number of cases of young marriage and the lack of participation of mothers in family planning programs resulted in many cases of pregnant women who have an age at risk of pregnancy.

#### 4.4. Relationship between ANC visits and LBW

Based on the findings obtained in the study [14] the Odd's Ratio value was 3.692 which showed that mothers with ANC visits less than 4 times had a risk of giving birth to LBW by 3.692 times compared to mothers with ANC more than 4 times. This study is in line with Saeni's research in Wonosobo Regency in 2012 which stated that if the mother made less than 4 ANC visits, the risk was 1.15 times greater for giving birth to LBW. The results of this study can be concluded that pregnant women with ANC visits less than 4 times more at risk of giving birth to LBW. This can be caused by unmonitored complications, nutrition, and health of the mother and fetus during pregnancy until delivery so that it interferes with fetal growth and can cause babies to be born with low weight. However, pregnant women who regularly make antenatal visits will get complete pregnancy care, so prevention is expected to be carried out as early as possible [15]. The results of a literature review in journals found that the factors that influence the incidence of LBW are pregnancy in adolescence, severe preeclampsia, anemia, and ANC visits. Based on several studies that have been carried out, there are research articles that are in accordance with this research.

#### 5. Conclusion

An indicator of a country's success in improving public health is by decreasing the Infant Mortality Rate (IMR). One of the factors that cause babies to die before the age of 1 year IMR is LBW. It can be concluded that the factors that influence (LBW are teenage pregnancy, pregnancy that occurs in adolescents aged 14-20 years, severe preeclampsia, anemia in pregnant women. Anemia in pregnant women can also be influenced by regular antenatal care or ANC.

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