

Risk factors for the incidence of low-birth-weight babies in Indonesia: A literature review

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Abstract

Low Birth Weight (LBW) is a critical issue in Indonesia, affecting 5-10% of newborns and contributing significantly to infant mortality. The primary risk factors include multiple pregnancies, maternal anemia, and insufficient maternal energy intake. The aim of this research is to identify the factors influencing the occurrence of low birth weight in Indonesia. The research method utilized is a literature review, which involves searching for research articles from the electronic database Google Scholar using keywords such as Low Birth Weight, causal factors, anemia, nutritional status, and maternal factors. From the research findings, it can be concluded that the occurrence of LBW is caused by risk factors such as anemia (3 articles), preeclampsia (3 articles), maternal age (3 articles), and chronic energy deficiency (1 article). Overall, understanding these factors is crucial for improving efforts to prevent LBW and enhancing the health of both mothers and infants during pregnancy.

Keywords: Low Birth Weight; Causal Factors; Anemia; Nutritional Status; Maternal actors

1. Introduction

Low Birth Weight (LBW) babies with a weight below 2500 grams are a serious issue in Indonesia, with a prevalence ranging from 5 to 10%. LBW contributes to 60-80% of infant deaths and increases the risk of infant mortality 20-fold. Although the prevalence of LBW reached the target of the National Medium-Term Development Plan (RPJMN) in 2019 at 8%, some provinces, especially rural areas, have still not achieved this goal [1].

The occurrence of Low Birth Weight (LBW) is the result of various factors, including both internal and external factors related to the mother. Internal factors involve the physical and health characteristics of the mother, such as maternal age (too young or too old), health conditions (chronic diseases), a history of previous LBW births, and nutritional status during pregnancy. External factors encompass social and economic aspects, such as education level, socio-economic status, access to healthcare, and lifestyle [2].

The most dominant risk factors contributing to the increased occurrence of Low Birth Weight (LBW) are multiple pregnancies, anemia, and gestational age. Multiple pregnancies often lead to restricted fetal growth, resulting in low birth weight. Maternal anemia is also a significant factor because insufficient hemoglobin in the mother's blood can reduce her ability to transport oxygen to the fetus. Additionally, pregnancy complications such as preeclampsia or gestational diabetes can impact fetal growth and contribute to the risk of LBW [3].

Furthermore, chronic energy deficiency (CED) is a risk factor that should not be overlooked. CED, which occurs when a mother does not receive sufficient energy intake over an extended period, can hinder fetal growth and lead to low birth

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weight babies [4]. Based on the background outlined above, the aim of this research is to identify the factors influencing the occurrence of low birth weight in Indonesia.

2. Material and methods

This research is classified as qualitative research using a literature review method and a descriptive analysis approach. The data for this study were sourced from national scientific journal articles obtained from the Google Scholar database using keywords such as "Low Birth Weight," "causal factors," "anemia," "nutritional status," and "maternal factors." The inclusion criteria for this research are scientific articles published within the last 5 years (2019-2023). The collected data will be analyzed, and conclusions will be drawn based on the analysis.

3. Results and discussion

Based on the collected and analyzed articles, the findings are presented as follows:

Table 1 List of Articles

No.	Author	Method	Result
1	Amelia et al. [4]	Case control	Complications during pregnancy, a history of illness, and chronic energy deficiency are risk factors significantly associated with the occurrence of Low Birth Weight (LBW) in the Kaluku Bodoa Primary Health Center area of Makassar City, with a significance level of < 0.05 .
2	Nurhayati et al. [5]	Case control	There is a significant influence between the mother's upper arm circumference and the occurrence of LBW (Low Birth Weight) at the Siti Fatimah Mother and Child Hospital in Makassar. There is a risk but not a significant influence between the mother's age and the occurrence of LBW.
3	Hatijar [6]	Cross sectional	There is a relationship between maternal age and nutritional status in relation to LBW with a p-value of $0.00 < \alpha = 0.05$.
4	Mapandin et al. [7]	Case control	The variables (anemia OR= 1.294, $p=0.005$, frequency of ANC visits OR= 2.715, $p=0.000$, exposure to cigarette smoke OR=1.471, $p=0.002$, pregnancy stress OR=1.262, $p=0.000$, with each having a significant level of $p<0.05$) have been proven to be risk factors for LBW (Low Birth Weight). The pregnancy stress variable is the most influential factor in the occurrence of LBW, with a Wald value of 15.894.
5	Azzizah et al. [8]	Case control	There is a relationship between the variables of maternal parity ($p=0.016$ and OR=2.001), preeclampsia ($p=0.002$ and OR=2.391), and anemia ($p=0.002$ and OR=2.435) with the occurrence of LBW (Low Birth Weight) at dr. Soekardjo Tasikmalaya Regional General Hospital.
6	Febrianti [9]	Case control	Age, parity, and anemia are associated with the occurrence of Low Birth Weight (LBW).
7	Aryana et al. [10]	Case control	Factors that have a significant relationship with the occurrence of Low Birth Weight (LBW) are maternal blood pressure ($p=0.000$), a history of delivering LBW babies ($p=0.000$), and the current type of baby delivery ($p=0.034$).
8	Hanif et al. [11]	Cross sectional	There is a relationship between preeclampsia and the occurrence of Low Birth Weight (LBW) ($p=0.000$; $r=0.46$). Furthermore, the risk of LBW in severe preeclampsia is higher compared to mild preeclampsia (OR=11.5).

Based on the 8 articles presented in Table 1, this discussion will focus on identifying risk factors for the occurrence of Low Birth Weight (LBW) in Indonesia.

A factor consistently identified as significantly influencing the occurrence of LBW is anemia. According to research by Azzizah et al. [8], mothers with anemia have a 2.435 times higher risk of giving birth to LBW babies compared to mothers without anemia. This may be due to the prevalence of anemia in mothers delivering LBW babies at dr. Soekardjo

Tasikmalaya Regional General Hospital (52.2%), which is much higher than in mothers delivering babies with normal birth weight (31.0%). Another study by Mapandin et al. [7] also shows that pregnant women with anemia have a higher rate, around 87%, compared to the control group, which is only about 65.2%. Based on the Odds Ratio test results, pregnant women with anemia have a 1.294 times higher risk compared to pregnant women without anemia. This is in line with research by Febrianti [9], which noted that about 60.6% of mothers in the case group had anemia, while only about 41.4% of mothers in the control group at Dr. M. Djamil Padang Hospital had anemia. Anemia can reduce oxygen supply in the mother's metabolism due to a lack of hemoglobin, which binds oxygen, which can indirectly impact both the mother and the baby, including the risk of infant mortality. Furthermore, the presence of anemia also negatively affects premature birth, increases the risk of infection, and can lead to maternal and fetal death [12].

Research by Azzizah et al. [8] reveals that mothers with preeclampsia have a 2.391 times higher risk of giving birth to LBW babies compared to mothers without preeclampsia. This finding aligns with the results of the study by Hanif et al. [11], which showed that mothers with severe preeclampsia had 40 cases of LBW, while those without preeclampsia had 45 cases of LBW. Aryana et al.'s research [10] also supports these findings, confirming that a significant factor influencing LBW is maternal blood pressure. Each unit increase in maternal blood pressure increases the risk of LBW by 11.52 times. Preeclampsia can lead to fetal malnutrition and oxygen deficiency in the womb due to narrowed blood vessels leading to the placenta. As a result, fetal growth is hindered, leading to low birth weight or premature birth. Premature birth can potentially have negative impacts on the baby's development, including learning difficulties, epilepsy, cerebral palsy, as well as hearing and vision problems [13].

The results of the study by Nurhayati et al. [5] show that the statistical analysis yielded an Odds Ratio (OR) value of 1.940. This value indicates that the high-risk age group in this study has a 1.940 times higher risk of experiencing LBW compared to the low-risk age group. This finding is consistent with Hatijar [6], which confirms a relationship between maternal age and LBW risk. Similarly, Febrianti's study [9] noted that the majority (48.5%) of mothers at risk in the case group were under the age of 20, while a small percentage (28.3%) were at risk in the control group at Dr. M. Djamil Padang Hospital. Pregnancy at an age below 20 or above 30 is considered high risk. Pregnancy at a young age under 20 is a risk factor because at this age, the mother's body is still growing, which means more food intake is used to meet her own growth needs. On the other hand, pregnancy at age above 35 often involves less fertile reproductive organs and increases the risk of giving birth to babies with congenital abnormalities and the risk of premature birth. In addition to these factors, chronic energy deficiency (CED) also plays a role, as per Amelia's research [4], which indicates that pregnant women in the group with Mid-Upper Arm Circumference (MUAC) < 23.5 (indicating CED) have a 4.561 times higher risk of giving birth to LBW babies compared to mothers with MUAC > 23.5.

4. Conclusion

Based on research findings, several factors significantly contribute to the occurrence of Low Birth Weight (LBW) in pregnant mothers. Anemia is consistently identified as a major influence, with a higher risk for mothers experiencing anemia. Preeclampsia and high maternal blood pressure also play a role in increasing the risk of LBW by affecting the supply of nutrition and oxygen to the fetus. Maternal age is also a risk factor, with very young mothers (under 20 years) or older mothers (over 30 years) having a higher risk. Additionally, chronic energy deficiency (CED) impacts the risk of LBW. Overall, understanding these factors is crucial for improving efforts to prevent LBW and enhancing the health of both mothers and infants during pregnancy.

Compliance with ethical standards

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