

ORIGINAL ARTICLE

Open Access

THE RELATINSHIP BETWEEN ANEMIA AND CHRONIC ENERGY DEFICIENCY (CED) IN PREGNANT WOMEN AND THE INCIDENCE OF LOW BIRTH WEIGHT (LBW) IN THE WORKING AREA OF ARJASA COMMUNITY HEALTH CENTER

Riskiyatun Nikmah^{1*}, Hidayati Ainul²

¹Nursing Student dr.Soebandi Jember University

²dr.Soebandi Jember Nursing Lecturer

*Correspondence Ainul Hidayati²

Email: ainulhidayati31@uds.ac.id

ABSTRACT

Introduction: Low Birth Weight (LBW) is one of the factors that contribute to mortality or Infant Mortality Rate (IMR) where the cases always increase every year compared to other developing countries. Low Birth Weight (LBW) babies have a smaller chance of survival and are more susceptible to disease until adulthood. One of the factors that can cause LBW is maternal Hb (Hemoglobin) below 11 g / dl and KEK with LILA below 23.5 cm **Methods:** The type of observational analytical research with a cross-sectional design and a retrospective approach using research instruments in the KIA book, where each research subject is only observed once, and measurements of independent variables and dependent variables are carried out at the same time. The population in this study was 62 with inclusion criteria of mothers who have babies under one year old, have a KIA book, and are willing to be respondents. With the sampling technique using the total sampling technique. **Results:** Shows that most respondents did not experience anemia during pregnancy as many as 33 respondents (53.2%) in the KEK category most did not experience KEK during pregnancy as many as 38 respondents (61.3%) and in the LBW category most did not experience LBW during delivery as many as 42 respondents (67.7%). From the results of the Chi-Square analysis of anemia with LBW, a p-value (0.533) > (0.05) was obtained, so it can be concluded that H0 is accepted and Ha is rejected, which means there is no relationship between anemia and the incidence of LBW and from the results of the KEK analysis with LBW, a p-value (0.672) > (0.05) was obtained, so it can be concluded that H0 is accepted and Ha is rejected, which means there is no relationship between KEK and the incidence of LBW **Discussion:** : Anemia in pregnant women and KEK does not directly affect the incidence of LBW, there are several other factors that influence it, namely maternal age, ANC visits, and consumption of Fe tablets and nutritious food

Keywords : Anemia, Low Birth Weight, CED

1. INTRODUCTION

The Infant Mortality Rate (IMR) remains a serious problem in Indonesia, with cases increasing annually compared to other developing countries. The high IMR, particularly during the perinatal period, is caused by Low Birth Weight (LBW), which accounts for the largest proportion of infant deaths in Indonesia (Utami *et al.*, 2024). Babies born with LBW also have a lower chance of survival and are more susceptible to disease into adulthood. Babies born with LBW are more susceptible to infections that can lead to death (Anasthasia & Utami, 2022). Among the factors contributing to LBW are maternal Hb levels below 11 g/dl and CED with a MUAC below 23.5 cm (Wahyuni *et al.*, 2022).

According to the World Health Organization (WHO, 2021), a Low Birth Weight (LBW) baby is a baby weighing less than 2500 grams at birth. Globally, an estimated 15-20% of all births, or >20 million newborns annually, are LBW, 95.6% of whom are in developing countries. According to the 2022 Indonesian Nutritional Status Survey (SSGI), the prevalence of LBW in Indonesia is 6.0%. Data from the Jember City and Regency data shows that the number of low birth weight (LBW) babies in East Java Province is 1,887 (Health Office, 2021). According to a report from the public health and nutrition section of the Jember Regency Health Office, the number of LBW babies in 2020 was 1,908 out of 3,609 newborns weighed (5.51%) (Jember Health Office, 2021).

Based on preliminary data from the Arjasa Community Health Center (Puskesmas), the data showed that LBW (low birth weight) in the Arjasa region was 37.5%, anemia in pregnant women was 42 (9.11%), and chronic energy deficiency (CED) in pregnant women was 95 (14.243%). Considering the high incidence of LBW, anemia, and CED among pregnant women in the region, the researcher wanted to conduct a study in the region. Health workers also stated that no research with this title had been conducted before.

According to (Retnaningtyas, Palupi, and Siwi, 2020), one factor influencing the incidence of LBW is maternal nutritional status. Pregnant women with poor nutritional status or experiencing CED (Chronic Energy Deficiency) tend to give birth to LBW babies and face a greater risk of death compared to babies born to mothers with normal weight. Iron deficiency or low hemoglobin (anemia) in pregnant women causes impaired oxygen supply to the fetus (hypoxia), inhibiting fetal growth. Anemia is also a factor influencing the incidence of LBW. Anemia in pregnant women is defined as a condition in which a pregnant woman experiences iron deficiency in the blood or a condition where the mother's hemoglobin level is <11g/dl.

Anemia increases the risk of premature birth and low birth weight (LBW). Furthermore, anemia in pregnancy increases the risk of bleeding during labor (Ministry of

According to research (Ratraningtiyas et al,2021), Chronic energy deficiency (CED) is a condition in which a pregnant woman suffers from prolonged (chronic or chronic) inadequate food intake, resulting in health problems, preventing the increased nutritional needs during pregnancy from being met. This puts her at risk of health hazards and low birth weight (LBW). CED and anemia in pregnant women are generally caused by low maternal nutrient intake during pregnancy (Kulsum & Wulandari, 2022).

One indicator for detecting the risk of CED is measuring the mid-upper arm circumference (MUAC) (Sudirman et al, 2023). The threshold value used is <23.5 cm, which indicates the risk of chronic energy deficiency in women of childbearing age. Many pregnant women still experience three nutritional problems, particularly malnutrition, namely Chronic Energy Deficiency (CED) and anemia. (Musaddik, Ayu, & Putri, 2022)

Based on research (Anastashia & Diah, 2023), Several factors also contribute to the incidence of low birth weight (LBW), including adherence to antenatal care (ANC) checkups, iron supplementation (TTD) consumption, maternal medical history, maternal occupation, family income, pregnancy status, education level, and maternal age (Barus et al., 2025).

Based on this data, anemia remains a common occurrence in pregnant women. Therefore, government programs to routinely consume iron tablets as prescribed, increase iron- and vitamin-C-rich foods, and attend regular antenatal care (ANC) checkups are essential. Furthermore, the prevalence of chronic energy deficiency (CED) in pregnant women is still high. Therefore, to prevent low birth weight (LBW), it is recommended that supplementary feeding programs be implemented (Widowati & Ningtiyas, 2023). This is a direct government intervention to provide additional nutritional intake to pregnant women at risk of CED. Pregnant women should also increase their dietary intake according to their needs, consume plenty of animal and plant-based protein sources, as well as fruits and vegetables. monitoring body weight and routine pregnancy check-ups (ANC) (Mahzar & Satriyandari, 2024).

2. METHODS

This research was conducted in March 2026, the method used in this observational analytical research using a cross-sectional design with a retrospective approach, where each research subject was only observed once, and the measurement of independent variables and dependent variables was carried out at the same time. The target population in this study were all mothers who had babies under one year old in the Arjasa Health Center Area in 2025, a total of 62 in all Arjasa Health Center Areas. The sample used in this study was a total sampling of 62 mothers with appropriate inclusion criteria, namely mothers who have babies under one year old, willing to be respondents, have complete data in the cohort book and have a KIA book and exclusion criteria, namely mothers with complications during pregnancy.

The stages of the study include ethical feasibility tests, Bakesbangpol permits, recommendation letters from the Health Office, and permits from the Arjasa Community Health Center. Data processing of the collected data was then processed so that the raw data could be organized, presented and analyzed so that the data could be concluded with the following processes: Editing, Coding, Tabulation. After the research and data collection process, researchers processed the data using the SPSS program. Data presentation includes univariate statistical analysis in this study, namely univariate and bivariate. Univariate is used to study the subject, namely the study of birth weight based on the characteristics of mothers who have babies under one year old, hemoglobin levels (Hb), and LILA. while bivariate analysis is used to determine the relationship between KEK and anemia in pregnant women with birth weight with nominal data. Researchers used observational sheets created by researchers to collect data starting from specific data including: respondent's name, Hb level, LILA and BBL, as well as general data including: age during pregnancy, education, parity, adherence to consuming Fe tablets, social status, and comorbidities during pregnancy. This research has passed an ethical feasibility test at KEPK Universitas dr. Soebandi Jember with ethical feasibility number No.197/KEPK/UDS/II/2026

3. RESULT

GENERAL DATA

Table 1. Frequency distribution based on age, education, parity, and adherence to iron tablet consumption in the Arjasa Community Health Center area in 2

Age	Frequency (f)	Percentage (%)
At risk (< 20 years and > 35 years)	16	25,8%
Not at risk	46	74,2%
Total	62	100,0%
Education		
Low education (Elementary, Middle school)	32	51,6%
Secondary education (High school)	24	38,7%
Higher education (D3, D4, Bachelor"s, Master"s, etc)	6	9,7%
Total	62	100,0%
Parity		
Primiparous (1 Time)	18	29,0%
Multiparous (2-4 Time)	32	51,6%
Granmultiparous (> 5 Time)	12	19,4%
Total	62	100,0%
Compliance with Iron Tablet Consumption		
Compliant (> 90 Tablets)	44	71,0%
Non Compliant (< 90 Tablets)	18	29,0%
Total	62	100,0%
Source: Primary Data, 2026		

Based on table 1, it shows that the distribution of frequency according to the average age of respondents is that most of them are not at risk (74.2%), in terms of education, most of the respondents have low education (51.6%), in terms of parity, almost half of the respondents are multiparous (51.6%) and in terms of compliance with consuming Fe tablets, most of the respondents are compliant (71.0%).

SPECIFIC DATA

Univariate Analysis

Table 2. Frequency distribution of anemia incidence in pregnant women in the Arjasa Community Health Center area in 2026

Anemia in Pregnant Women	Frequency (f)	Percentage (%)
Anemia	25	40,3%
Not Anemic	37	59,7%
Total	62	100,0%

Source: Primary Data, 2026

Based on Table 2, it shows that the majority of respondents did not experience anemia during pregnancy, namely 37 respondents (59.7%), and almost half of the respondents experienced anemia during pregnancy, namely 25 respondents (40.3%).

Table 3. Distribution of frequency of occurrence of Chronic Energy Deficiency (CED) in pregnant women in the Arjasa Health Center area 2026

SEZ in Pregnant Women	Frequency (f)	Percentage (%)
CED	24	38,7%
Not CED	38	61,3%
Total	62	100,0%

Source: Primary Data, 2026

Based on table 3, it shows that the majority of respondents did not experience Chronic Energy Deficiency (CED), namely 38 respondents (61.3%) and almost half of the respondents experienced Chronic Energy Deficiency (CED), namely 24 respondents (38.7%).

Table 4. Distribution of the frequency of occurrence of Low Birth Weight (LBW) Babies in the Arjasa Health Center Area 2026

Low Birth Weight (LBW) Infants	Frequency (f)	Percentage (%)
LBW	20	32,3%
Non-LBW	42	67,7%
Total	62	100,0%

Source: Primary Data, 2026

Based on table 4, it shows that the majority of 42 respondents (67.1%) did not experience Low Birth Weight (LBW) and almost half of the respondents experienced Low Birth Weight during delivery, namely 20 respondents (32.3%).

Bivariate Analysis

Table 5. Relationship between anemia in pregnant women and the incidence of low birth weight (LBW) in the Arjasa Community Health Center area in 2026

Anemia in Pregnant Women	LBW		Non-LBW		Total		<i>p-value</i>	<i>Odds Ratio</i>
	f	%	f	%	f	%		
Anemia	11	37,9%	14	56,0%	25	100,0%	0,177	2,444
Non Anemia	9	27,3%	28	75,7%	37	100,0%		
Total	20	32,3%	42	33,9%	62	100,0%		

Based on table 5. Showing the results of the chi-square test, it can be seen that the p-value of 0.177 is greater than 0.05 ($p\text{-value} > 0.05$) so that H_0 is accepted and H_a is rejected, it can be concluded that there is no relationship between anemia in pregnant women and the incidence of Low Birth Weight Babies (LBW). Anemia occurs at Hb levels of 11 g / dl while most respondents have Hb levels > 11 g / dl. The Odds Ratio results obtained are 2.444 which shows that pregnant women with anemia have a 2.444 chance of experiencing LBW compared to pregnant women without anemia. Thus, it can be interpreted that pregnant women with anemia experience LBW (11 respondents), while pregnant women without anemia and not LBW (28 respondents).

Table 6. Relationship between KEK in pregnant women and the incidence of Low Birth Weight (LBW) in the Arjasa Health Center area in 2026

CED in pregnant women	LBW		Non LBW		Total		<i>p-value</i>	<i>Odds Ratio</i>
	f	%	f	%	f	%		
CED	11	45,8%	13	54,2%	24	100,0%	0,124	2,726
Non CED	9	23,7%	29	76,3%	38	100,0%		
Total	20	32,3%	42	67,7%	62	100,0%		

Based on table 6. Showing the results of the chi-square test, it can be seen that the p-value of 0.124 is greater than 0.05 ($p\text{-value} > 0.05$) so that H_0 is accepted and H_a is rejected, so it can be concluded that there is no relationship between Chronic Energy Deficiency (CED) in pregnant women and the incidence of Low Birth Weight (LBW) Babies. The results obtained were an Odds Ratio of 2.726, which shows that pregnant women without CED have a 2.726 chance of experiencing LBW compared to mothers without CED. Thus, it can be interpreted as pregnant women with CED who experience LBW (11 respondents), while pregnant women who do not have CED and are not LBW (29 respondents).

4. DISCUSSION

1) Incidence of Anemia in Pregnant Women in the Arjasa Community Health Center Area in 2026

The results of the study, as shown in Table 2, show that the majority (37 respondents (59.7%) were not anemic, and nearly half (25 respondents (40.3%) were anemic. Anemia in pregnancy is defined as a Hb level of less than 11 g/dl. The most common nutritional cause of anemia is iron deficiency. Most respondents adhered to taking iron tablets regularly during pregnancy to ensure adequate iron intake, as well as proper prenatal check-ups and care., as well as proper prenatal check-ups and care.

Consuming insufficient iron tablets or less than the recommended daily intake of 90 tablets during pregnancy results in unmet iron needs. If iron intake is insufficient, the mother is at risk of anemia (low hemoglobin levels) and impacts the fetus, such as the risk of low birth weight (LBW).

According to research (Hidayah W & Anasari T, 2021), anemia has a harmful impact on the mother's pregnancy, and adherence to consuming iron tablets is related to the incidence of anemia during pregnancy. This is because iron tablets can increase hemoglobin (Hb) levels and reduce iron deficiency in mothers during pregnancy. This is in line with data obtained by researchers, where the majority of respondents, 44 respondents (71.0%), adhered to consuming iron tablets. Therefore, consuming iron tablets regularly plays a crucial role in preventing anemia during pregnancy and the occurrence of Low Birth Weight (LBW) babies (Wahyuni et al, 2022).

2) Chronic Energy Deficiency (CED) and the Incidence of Low Birth Weight (LBW) Babies in the Arjasa Community Health Center Area in 2026

Based on the research results in Table 3, it shows that the majority (38 respondents) did not experience CED, while almost half (24 respondents) experienced CED. Chronic energy deficiency is a nutritional deficiency problem in pregnant women. Pregnant women are susceptible to several malnutrition problems due to their increased needs. Nutritional problems in pregnant women impact the health of both the mother and the baby. CED occurs during pregnancy due to an imbalance between nutritional intake and nutritional needs. CED is identified by measuring the mid-upper

arm circumference (MUAC) of pregnant women, which is less than 23.5 cm. Several other factors can contribute to CED, including maternal age and parity. According to research (Quratul A, et al., 2021), high-risk age (<20 years and >35 years) is associated with the incidence of CED, because the younger or older a mother's age during pregnancy will influence suboptimal biological and physiological factors. Adolescents (<20) are still growing, resulting in nutritional competition between the mother and fetus, while those aged >35 years experience decreased physiological and metabolic reserves, increasing the risk of malnutrition. According to existing research, parity is also associated with the incidence of CED. A good parity is 2 times because mothers need sufficient energy to recover after giving birth (Zahro & Isnani, 2022).

The more frequently a woman pregnancies and deliveries, the greater the risk of anemia and CED because pregnancy depletes the body's energy, protein, and iron reserves. This is in line with the data obtained by researchers, the frequency distribution based on age, most respondents are not at risk as many as 44 respondents (71.0%), and in the frequency distribution based on parity, most respondents are multiparous, namely 32 respondents (51.6%), Therefore, age and parity during pregnancy need to be considered because they are related to the health condition of pregnant women, so that a healthy and balanced nutritional diet has an important role in forming optimal nutritional status in pregnant women and health in the fetus. Nutritional deficiencies in pregnant women tend to result in LBW or general abnormalities. This KEK condition describes the unfulfilled nutritional needs, while pregnancy requires additional nutrition and other substances due to increased energy metabolism.

3) Incidence of Low Birth Weight (LBW) Babies in the Arjasa Community Health Center Area in 2026

Table 4 shows that the majority of 42 respondents (67.1%) did not experience low birth weight (LBW), and almost half of the respondents (20 respondents) experienced low birth weight during delivery. A low birth weight (LBW) baby is a baby weighing less than 2500 grams, regardless of gestational age. Birth weight is the weight measured one hour after birth. Low birth weight (LBW) is a risk factor contributing to infant mortality, particularly during the perinatal period. Several risk factors are associated with LBW, including anemia in pregnant women, CED, and

maternal age during pregnancy. Maternal age is a crucial factor influencing the health of both mother and fetus. The ideal reproductive age range for women to conceive and give birth is between 20 and 35 years (Hamang and Nurhayati, 2020).

Research (Pitriani T, et al. 2022) shows a significant correlation between maternal age and the incidence of low birth weight (LBW). Pregnancy at age 35 tends to result in inadequate nutritional intake for fetal growth, which can result in low birth weight. This is because at age <20, a woman's reproductive organs are not yet ready and mature, as is the mother's psychological state, resulting in suboptimal fetal growth in the mother's womb. Meanwhile, at age >35, reproductive organs are also no longer optimal for fetal growth (Iskandar et al, 2022).

This is in line with data obtained by researchers, where the majority of respondents' ages were not at risk (44 respondents (71.0%)), indicating that age can also be a factor influencing the incidence of low birth weight (LBW). Based on the data obtained, the majority of respondents' ages were not at risk, so the data obtained also showed that most respondents did not experience low birth weight (LBW).

4) The Relationship Between Anemia in Pregnant Women and the Incidence of Low Birth Weight (LBW) Babies in the Arjasa Community Health Center Area in 2026

Based on the statistical analysis in Table 5, the Chi-square test results show a p-value of 0.177, which is greater than 0.05 (p-value > 0.05). Therefore, H_0 is accepted and H_a is rejected. Therefore, it can be concluded that there is no relationship between anemia in pregnant women and the incidence of Low Birth Weight (LBW). Anemia is not always the primary factor influencing the occurrence of Low Birth Weight (LBW). Other factors are more dominant, such as gestational age at delivery and genetics. Furthermore, pregnant women with anemia may still be able to give birth to babies with normal birth weight if they receive proper treatment, such as adequate nutrition and regular health monitoring during pregnancy.

Based on research (Astutia & Luluk, 2024) The lack of a relationship between anemia and the incidence of Low Birth Weight (LBW) babies may be due to the anemia in pregnant women being mild, allowing the fetus's oxygen and nutrient needs to be met. Furthermore, pregnant women with anemia are likely to still receive good nutrition, regularly take iron

tablets, and undergo regular prenatal checkups to ensure optimal fetal growth and a normal birth weight (Aprina M, 2024).

According to research (Sri Handayani, et al. 2024), some pregnant women who are not anemic still give birth to low birth weight babies. Therefore, the incidence of low birth weight is influenced not only by anemia but also by other factors such as maternal nutritional status, gestational age, comorbidities, and the mother's health during pregnancy (Wahyu et al, 2024).

This is also in line with research (Khezri R, et al. 2025). The lack of a relationship between anemia in pregnant women and the incidence of low birth weight (LBW) in this study was due to the majority of respondents having normal hemoglobin levels, i.e., >11 g/dl. Respondents also received regular iron tablet supplementation, and most respondents were compliant in taking the prescribed tablets. Furthermore, other factors more dominantly influence birth weight, such as maternal nutritional status, gestational age at delivery, and maternal health during pregnancy (Hamang, 2021).

According to assumptions based on the data obtained by the researchers, the incidence of low birth weight (LBW) is an important indicator in assessing the health of the mother and fetus during pregnancy. LBW is often associated with various risk factors, such as maternal nutritional status, health conditions, and environmental factors. However, this study did not find a relationship between the incidence of LBW and anemia in pregnant women.

5) The Relationship Between Chronic Energy Deficiency (CED) in Pregnant Women and the Incidence of Low Birth Weight (LBW) Babies in the Arjasa Community Health Center Area in 2026

Based on the statistical analysis in Table 6, the Chi-square test results show a p-value of 0.124 greater than 0.05 ($p\text{-value} > 0.05$). Therefore, H_0 is accepted and H_a is rejected. Therefore, it can be concluded that there is no relationship between anemia in pregnant women and the incidence of Low Birth Weight (LBW). CED is not always the primary factor influencing the occurrence of LBW. Other factors may be more dominant, such as placental conditions, maternal comorbidities, gestational age at delivery, and genetic factors. Furthermore, pregnant women with CED may still be able to deliver babies with normal birth weight if they receive proper care, such as

adequate nutrition, supplementary feeding, and regular health monitoring during pregnancy.

Based on research (Bahrum, 2024), The absence of a relationship between CED and the incidence of LBW may be due to the fact that pregnant women with CED are still able to meet their nutritional needs during pregnancy through improved diet, supplementary feeding, and regular antenatal checkups. Furthermore, fetal growth is not only influenced by the mother's chronic energy deficiency (CED) status, but also by other factors such as gestational age, maternal health, anemia, comorbidities, and genetic factors (Aprina M, 2024).

According to research conducted by (Nurul F and Siti N, 2022), no significant association was found between CED in pregnant women and the incidence of low birth weight (LBW) because other factors more dominantly influence birth weight. This is also in line with research by (Neni Nuraeni, 2024). The lack of association between Chronic Energy Deficiency (CED) in pregnant women and the incidence of low birth weight (LBW) in the Arjasa Community Health Center area in this study could be due to several factors. One of these is the availability of good antenatal care services, which allows pregnant women with CED to be detected early and receive interventions such as nutrition education, supplementary feeding, and routine pregnancy monitoring. This condition allows for maternal nutritional status to improve during pregnancy, thus maintaining optimal fetal growth (Iskandar & Ihsan, 2022).

Based on assumptions from the data obtained by researchers, the incidence of low birth weight (LBW) is an important indicator in assessing the health of the mother and fetus during pregnancy. LBW is often associated with various risk factors, such as maternal nutritional status, health conditions, and environmental factors. However, this study found no association between LBW and Chronic Energy Deficiency (CED) in pregnant women.

4. CONCLUSION

Based on the research objectives and results, the following conclusions were reached:

Based on the research results, the majority of respondents in the Arjasa Community Health Center area did not experience anemia during pregnancy or Chronic Energy Deficiency (CED). Furthermore, the majority of respondents also did not experience Low Birth Weight (LBW) infants. The analysis results indicate that anemia has no direct relationship with the incidence of LBW in the Arjasa Community Health Center area. Similarly, Chronic Energy Deficiency (CED) has no direct relationship with the incidence of Low Birth Weight (LBW) infants in the Arjasa Community Health Center area.

5. AUTHOR'S CONTRIBUTIONS

1. Author : Riskiyatun Nikmah
2. Supervisor 1 : Ainul Hidayati, S.Kep.,Ns.,M.KM

6. CONFLICT OF INTEREST

study does not cause a conflict of interest because it uses its own costs.

REFERENCES

- Amalia, K. (2022) "Factors Associated with the Incidence of Iron Deficiency Anemia in Pregnant Women in the Lasi Community Health Center Work Area. Page 58 Published by the Health Scientific Forum (FORIKES). Page 59 Published by the Health Scientific Forum (FORIKES).," 1(10), pp. 58–65.
- Bahrum, S.W. (2024) "Analysis of Prevention, Control, and Impact of Low Birth Weight (LBW) in Indonesia - Literature Study," *Health News Journal*, 17(2), pp. 87–95. Available at: <https://doi.org/10.58294/jbk.v17i2.215>.
- Barus, E.R. et al. (2025) "Factors Associated with the Incidence of Low Birth Weight (LBW)," 4(1), pp. 1433–1444.
- Celena, A. et al. (2022) "Low Birth Weight (LBW) Classification Using the Support Vector Machine Method with the SMOTE Technique," 6(7), pp. 3442–3451.
- Health Office (2019) Number of Babies Born, Low Birth Weight (LBW), and Undernourished in East Java Province by Regency/City, 2018, Central Statistics Agency of East Java Province. Available at: <https://jatim.bps.go.id/id/statistics-table/1/MTY3NSMx/jumlah-bayi-lahir-bayi-berat-badan-lahir-rendah-bblr-dan-bergizi-kurang-di-provinsi-jawa-timur-menurut-kabupaten-kota-2018-.html>.
- Jember Health Office (2021) "Jember Regency Health Profile 2020," Jember PPID [Preprint].
- Hamang, S.H. and Nurhayati (2020) "Risk factors for low birth weight," 01(01), pp. 21–22.
- Iskandar, Rahcmawati, Ichsan, W.K. (2022) Improving nutrition in pregnant women with chronic energy deficiency (CED) through supplementary feeding assistance, *Jurnal Pade; Pengabdian Masyarakat dan Edukasi*.
- Izzara, W.A. et al. (2023) "Causes, Prevention, and Management of Anemia in Adolescent Girls (Literature Study)," *Jurnal Multidisciplinary West Science*, 2(12), pp. 1051–1064. Available at: <https://doi.org/10.58812/jmws.v2i12.817>.
- Ministry of Health (2023a) Anemia in Pregnancy, Ministry of Health. Available at: https://keslan.kemkes.go.id/view_artikel/2918/anemia-pada-kehamilan.
- Ministry of Health (2023b) Recognizing the Symptoms of Anemia in Adolescents, Ministry of Health. Available at: <https://ayosehat.kemkes.go.id/mengenal-gejala-anemia-pada-remaja>.
- Ministry of Health (2024) Webinar on the Latest Management of Low Birth Weight (LBW), Ministry of Health of the Republic of Indonesia. Available at: <https://lms.kemkes.go.id/courses/6b547b3f-981a-4179-b0ac-84ecb7e89154>.
- Musaddik, Linda Ayu Rizka Putri, H.I.M. (2022) "The Relationship Between Socioeconomic Status and Dietary Patterns with the Incidence of Chronic Energy Deficiency (CED) in Pregnant Women in the Nambo Community Health Center Work Area, Kendari City," 9, pp. 19–26.
- Pebrina Manurung (2021) "The Relationship between a History of Pregnancy Complications and the Incidence of Low Birth Weight (LBW) in Indonesia," 4(2). Available at:

Nikmah *et al. Journal of Nursing Periodic* (2026) Vol: 3 Issue 2
<https://doi.org/10.7454/epidkes.v4i2.4069>.

Retnaningtyas, E., Palupi, R., and Siwi, Y. (2020) "Analysis of the Incidence of Anemia and Chronic Energy Deficiency (CED) in Pregnant Women with LBW at Gambiran Regional Hospital, Kediri," Conference on Innovation and Application of Science and Technology.

Retno Anasthasia, T., and Diah Utami, E. (2022) "Factors Influencing the Incidence of Low Birth Weight in Indonesia in 2020," National Seminar on Official Statistics, 2020(2021), pp. 863–872.

Riri Mahzar, Y.S. (2024) "The Relationship Between Anemia in Pregnant Women and the Incidence of Low Birth Weight (LBW) Babies at PKU Muhammadiyah Gamping Hospital," 7(1), pp. 9–17.

Sinulingga, E.L.B. et al. (2021) "Counseling on the Need for Low Birth Weight (LBW) Care," Journal of Nursing and Midwifery Partners, 3(4), pp. 96–100.

Sudirman, J., Marwang, S., and Passe, R. (2023) "Efforts to Manage and Prevent Chronic Energy Deficiency (CED) Through Nutrition Education for Women During the Preconception Period," Media Abdimas, 3(2), pp. 46–51. Available at: <https://doi.org/10.37817/mediaabdimas.v3i2.2765>.

Umni Kulsum and Dyah Ayu Wulandari (2022) "Efforts to Reduce the Incidence of KEK in Pregnant Women Through Health Education," Jurnal Pengemas Kesehatan, 1(01), pp. 27–30. Available at: <https://doi.org/10.52299/jpk.v1i01.6>.

Utami, S.R. et al. (2024) "Prevalence of Neonatal Mortality with Low Birth Weight (LBW) at Praya Regional Hospital, Central Lombok," Malahayati I Health Student Journal, 4, pp. 2374–2382.

Wahyuni, S. et al. (2022) "The Relationship of Anemia in Pregnancy with the Incidence of LBW Babies (Low Birth Weight) at Supiori Hospital," 4(2), pp. 0–4. Available at: <https://doi.org/10.35451/jkk.v4i2.1051>.

WHO (2021) Preterm and Low Birth Weight Infants, WHO (World Health Organization. Available at: <https://www.who.int/teams/maternal-newborn-child-adolescent-health-and-ageing/newborn-health/preterm-and-low-birth-weight>.

WHO (2023) Anemia, WHO (World Health Organization. Available at: <https://www.who.int/health-topics/anaemia>.

Widowati, N. and Farida Wahyu Ningtyias, S. (2024) "Analysis of Maternal Factors with the Incidence of LBW Infants at Situbondo Health Center: Study of Cohort Register Data in 2020

