

## Correlation of anemia in pregnancy and low birth weight in public health centers

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### ABSTRACT

This study aims to look at the prevalence of anemia and LBW and also evaluate the correlation of anemia in pregnancy with LBW. This study method is observational analytic approach named cohort retrospective. It is used to analyze the correlation between the incidence of LBW and anemia in pregnancy located in the Public Health Center of Pulau Untung Jawa Village, Kepulauan Seribu Selatan Sub-District, DKI Jakarta. The acquisition data was obtained for the period January – July 2022 where the samples of all babies born and all mothers who gave birth at the Public Health Center. The number of samples obtained 39 samples. This study used inclusion criteria, namely infants with LBW and not LBW and also their mothers, pregnant women who were anemic and not anemic. Beside, they had exclusion criteria that include mothers with a history of premature birth. Researchers took samples by collecting data in the medical record of childbirth in 2022 by taking data in the form of samples of baby weight after birth, maternal delivery data, maternal and infant identity, gestational age, Hb status, parity, and antenatal care data. Data obtained on the anemia prevalence in respondents at the Public Health Center is mild anemia of 15%, then 75% moderate anemia, severe anemia of 7,5%, and no anemia as much 2,5%. So, it can be concluded that the highest prevalence of anemia is moderate anemia. Results of p value > 0.05 and OR = 0,147 which means that there is no significant correlation between anemia in pregnancy on LBW and mothers with anemia. It will occur smaller LBW rather than in mothers with a history of anemia.

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## INTRODUCTION

Anemia is defined as a decrease concentration of hemoglobin (HB) or hematocrit in the body, where the value obtained is in the lowest value range due to the least production of erythrocyte red blood cells and hemoglobin (Kishimoto et al., 2020). This disease is easy to attack all people at all ages, such as infants or toddlers, adolescents, adults, the elderly (Kishimoto et al., 2020), and

pregnant women. Anemia in pregnancy is a condition of the decrease in blood cell levels or hemoglobin levels (Bhadra & Deb, 2020). It causes the oxygen level transported as the needs of important organs in the mother and fetus in the womb are reduced (Desoye & Carter, 2022). So, it can be one of the risk factors for low birth weight babies (LBW) (Amri et al., 2020). Data from the Central Bureau of Statistics show an increase in the prevalence of anemia in pregnant women (Srouf et al., 2018). In 2013, there were 37,1% of pregnant women suffered from anemia and increased in 2018 with a percentage of 48,9% (Dahlan & Ardhi, 2021).

During pregnancy, an indication of anemia is when the hemoglobin level whose values are below 10,5 g/dl to 11,0 g/dl (Mahamoud et al., 2020). During the period of gestation, iron is used for the fetus's development, placenta, the development of erythrocytes, and for the main needs of the body (Donker et al., 2021). Some factors can be a risk factor for the anemia in pregnant women. It could be the presence of basic factors, such as socioeconomic status, knowledge, education, culture (Ali et al., 2018), indirect factors like a history of previous pregnancies, antenatal care visit, age (Kotoh & Boah, 2019), other indirect factors such as iron supplement consumption patterns, bleeding, and also infections (Kumar et al., 2022). Symptoms that can arise from these disease include lethargy, fatigue, anorexia, indigestion, stomatitis, and others (McKnight, 2020). While, the complications that can arise due to anemia during pregnancy are (pre-eclampsia (A. Rahmah et al., n.d.), recurrent infections, heart failure, preterm labor), during labor (uterine inertia, heart failure, postpartum hemorrhage) (Dahiya et al., 2019), during the puerperium (puerperal sepsis, sub involution, lactation failure) (Windarti & Dewi, 2020).

A low birth weight baby (LBW) is a newborn who has a body weight at birth below 2500 grams (Lifrinur et al., 2019). Low birth weight babies can not only occur in babies born at term (Nakano, 2020), although generally low weight babies occur in babies not at term. Full-term babies who experience obstacles during growth in the womb are also the cause of the babies birth with low body weight (Marwati & Sunarsih, 2020). Weight is an important guideline in health reference in newborns (Harrison et al., 2018). Babies who have low body weight need to be given care or treatment (Ells et al., 2018). It happens because low birth weight babies can cause health complications, such as digestive disorders, respiratory system, cardiovascular, central nervous system, immunology, and hematology (Aktepe et al., 2022). Generally, babies born with low-weight conditions come from developing countries, such as Indonesia (Wulandari et al., n.d.). Obtained the infant comparative incidence who have low birth weight is greater in mothers who have anemia in pregnancy (Lake & Olana Fite, 2019). Pregnant women generally have a high risk of anemia in the third trimester of pregnancy and before delivery birth which is caused by (Agbozo et al., 2020). After birth, the baby will use iron as a food reserve for his own body. The mortality risk of babies who have low birth weight is at least 8x greater than babies who have normal weight (Murni et al., 2020). Where the LBW is one of the biggest factors of mortality and morbidity during these 5 years which is caused by a lack of understanding of anemia in pregnancy (Pusdekar et al., 2020).

Data from the Central Bureau of Statistics show an increase in the prevalence of anemia in pregnant women. In 2013, the incidence of anemia in pregnant women was 37,1% and in 2018, it increased to 48,9%. PKU Muhammadiyah Hospital Yogyakarta conducted research on anemia in pregnant women with the LBW case which obtained a figure of 76 cases of infants with LBW and 76 controls with normal birth weight babies (BBLN). From the data obtained, it was found that the incidence of LBW is higher in mothers who have anemia as many as 39 people (51,3%) rather than in mothers who do not have anemia as many as 37 people (48,7%). Meanwhile, in mothers who are BBLN have more cases for those who do not have anemia that as many as 52 people (68,4%) than those who have anemia that is 24 people (31,6%).<sup>7</sup> Susanti Suhartati, et al. conducted a study at the Tanta Health Center, Tabalong Regency, and got the results of anemic mothers consisting of 60 people (55,6%) gave birth to babies with low weight as many as 31 babies (51,6%) and gave birth to babies with normal weight as many as 29 people (48,3%). Mothers who had no anemia consisting of 48 people (44,4%) gave birth with the low birth weight babies as many as 5 babies (10,4%) and

gave birth to normal birth babies as many as 43 babies (89,5%). This suggests that there is a correlation between anemia in pregnancy and a low incidence of babies born.

Through the support of education understanding related to the incidence of anemia in pregnancy, such as education about the nutrients needed in pregnancy, the importance of taking iron tablets, and vitamin C which can help the body to absorb iron tablets. Maintaining health during pregnancy can be an effort in controlling the incidence of anemia in pregnancy. A lack of understanding about anemia, and a lack of understanding of the signs and symptoms and effects that cause anemia, are among the main factors in the high incidence of anemia in pregnancy. This study aims to look at the prevalence of anemia and LBW and also evaluate the correlation of anemia in pregnancy with LBW.

## RESEARCH METHOD

This study method is observational analytic approach named cohort retrospective (Seidu et al., 2021). It is used to analyze the correlation between the incidence of LBW and anemia in pregnancy located in the Public Health Center of Pulau Untung Jawa Village, Kepulauan Seribu Selatan Sub-District, DKI Jakarta. The acquisition data was obtained for the period January – July 2022 where the samples of all babies born and all mothers who gave birth at the Public Health Center (Seidu et al., 2021). The number of samples obtained 39 samples. This study used inclusion criteria, namely infants with LBW and not LBW and also their mothers, pregnant women who were anemic and not anemic (Q. J. Rahmah et al., 2022). Beside, they had exclusion criteria that include mothers with a history of premature birth (Huusko et al., 2018). Researchers took samples by collecting data in the medical record of childbirth in 2022 by taking data in the form of samples of baby weight after birth, maternal delivery data, maternal and infant identity, gestational age, Hb status, parity, and antenatal care data.

## RESULTS AND DISCUSSIONS

The study was conducted by the researchers through collecting medical records of childbirth from January to June 2022. The samples were taken from infants and mothers who gave birth at the Public Health Center of Pulau Untung Jawa, Kepulauan Seribu Selatan, DKI Jakarta. There was one case with the data of babies in a normal birth weight, so the total data obtained in this study as many as 39 data. Research subjects were based on baby weight from data that has been obtained from thirty-nine respondents. These can be seen that LBW <2.5 kg as many as five respondents (12,8%), BBLN 2.5 – 4.0 kg as many as thirty-five respondents (87,2%) and no newborns with high weight >4.5 kg.

**Table 1.** Characteristics of the Study Subjects seen from the Baby's Weight

Classification	Baby Weight		
	Categories	N	%
Low	<2.5 kg	5	12,8%
Normal	2.5-4.0 kg	34	87,2%
Height	>4.0 kg	0	0%
Total		39	100%

From the data that have been obtained, characteristics of gestational age with the term pregnancy or full-term babies of 37-41 weeks are thirty-nine respondents (100%) and none of the respondents with a period of post term pregnancy or more months >41 weeks. The results of the study obtained that characteristics of Hb status in pregnant women from thirty-nine respondents of not anemia category with hemoglobin levels >10.9 g/dL as many as zero respondents (0%). Mild anemia category with hemoglobin levels 10-10.9 g/dL as many as six respondents (15,4%). Moderate category with Hb levels 7-9.9 g/dL as many as thirty respondents (76,9%), and severe anemia category with hemoglobin levels <7 g/dL as many as three respondents (7,7%).

**Table 2.** Characteristics of Research Subjects based on the Hb Status

Hemoglobin Levels	HB Status		
	Categories	N	%
>10.9 g / dL	Not anemic	0	0%
10 - 10.9 g / dL	Mild Anemia	6	15,4%
7 - 9.9 g / dL	Moderate Anemia	30	76,9%
<7g / dL	Severe Anemia	3	7,7%
	Total	39	100%

Then the test results of chi square aims to know the correlation between variables. In the this test, a total of 39 respondents showed low baby weight with mild anemia value of one, moderate anemia were four and as many as zero for severe anemia with low birth weight babies. Then, the normal weight has a value of mild anemia of five, moderate anemia was twenty six, and severe anemia was three. The results showed the value of  $p=0.521$  so that the value of  $p > 0.05$ . Thus, it can be concluded that anemia of pregnant women is not significantly correlated with LBW.

**Table 3.** Chi Square Test Results based on the Correlation between Low Birth Weight and Anemia

Characteristics	LBW	Normal Newborn	Total	<i>p</i>
Mild Anemia	1	5	6	
Moderate Anemia	4	26	30	0.521
Severe Anemia	0	3	3	
Total	5	34	39	

From the epidemiological tests, the value of odds ratio=0.147. It means that mothers with anemia will occur less LBW than mothers with a history of anemia.

**Table 3.** Chi Square Test Results based on the Correlation between Low Birth Weight and Anemia

Characteristics	LBW	Normal Newborn	Total	<i>p</i>	OR
Anemia	5	34	39		
Not anemic	0	0	0	0.00	0.147
Total	5	34	39		

Respondents who participated in this study were newborns and their mothers who gave birth at the Public Health Center. The most data of weight newborns in the normal weight category 2.5-4.0 kg is 87,2% and low weight <2.5 kg is 12,8% of thirty-nine respondents. Central Lampung showed that normal newborn weight was 2.5 kg - 4.0 kg which was 84,87% and low body weight <2.5 kg which was 15,13%.[18] Based on the most gestational age in the pregnancy category of aterm or full-term baby 37 - 41 weeks is 100% and there was no a pregnancy period with more months. Meanwhile, based on other research, stated that the gestational age in preterm pregnancy or fewer months <37 weeks is 19%. Besides, at gestational age, enough term is 55% and the pregnancy period with more months >41 weeks is 26.[19] This can be seen in the status of gestational age with less or more months is quite high in 'X' Ponogoro Hospital than in the Public Health Center. The results obtained based on the HB status of pregnant women with the largest number of moderate anemia is 76,9% and the least Hb status in pregnant women with severe anemia is 7,7%. The anemia case is high at almost 91%, anemia seen in the second trimester of pregnancy and the lowest in the third trimester. Anemic pregnant women show a decrease in hemoglobin concentration in the second trimester and an increase in hemoglobin concentration in the first and third trimesters. In another study, respondents stated that 21% of mothers were anemic and 79% were not anemic. Moreover, the need for calories and protein increases during pregnancy. In the last week, there is an increase in the calorie requirement to around 80.000-kilo calories. Recommendations from the National Research Council in 1989 stated that in pregnancy at least 300 kcal/day given additional calories. Energy needs that are not fulfilled or fulfilled will be taken from the body's protein supply which should have an important function in the growth and development of the fetus.

Based on the research results obtained by LBW, as many as 12,5% of the total forty respondents, namely LBW with mild anemia as much as 20% and LBW with severe anemia as much as 80%. So, it can be seen that more LBW babies experienced moderate anemia. Test results of chi square test obtained p value = 0.521 and OR = 39 so that it can be stated that the value  $p > 0.05$ . It means that there is no significant correlation between LBW to anemia, but pregnant women with mild anemia are 39 times more likely experience LBW rather than pregnant women who suffer from moderate or severe anemia. While the studies show a decrease in newborn weight by 21 grams per 1 g/dl hb for mothers who have anemia in pregnancy. This study stated that maternal anemia affects the restriction of the growth process by intrauterine fetus so that it can affect the baby's weight.[20] The researcher assumed that the difference between this study with the previous research is likely due to the few respondents in this study and the majority of respondents' gestational age was aterm gestational age. Meanwhile, another study mentioned that there is a significant correlation between the case of anemia with LBW with the value p value  $< 0,05$  (0,00) and OR 39. In this study, it proved that a significant correlation between the incidence of anemia with LBW and mothers with anemia has 39 times the risk of causing LBW than those without anemia.

## CONCLUSION

Data obtained on the anemia prevalence in respondents at the Public Health Center is mild anemia of 15%, then 75% moderate anemia, severe anemia of 7,5%, and no anemia as much 2,5%. So, it can be concluded that the highest prevalence of anemia is moderate anemia. Results of p value  $> 0.05$  and OR = 0,147 which means that there is no significant correlation between anemia in pregnancy on LBW and mothers with anemia. It will occur smaller LBW rather than in mothers with a history of anemia. The amount of hemoglobin in the mother's blood is very influential in the baby's weight. This is due to the level of nutrients and oxygen supply to the placenta, and this will affect the work of the placenta to the fetus. Anemia in pregnancy can increase the risk of a baby birth with low weight, the risk of bleeding at the time of delivery and before delivery, and can even cause the death of the baby and the mother if the woman has severe anemia. It is recommended for pregnant women to rest enough, and consume enough food and vitamins, especially pregnant women who are vegetarians because they have a greater risk of anemia. Moreover, for pregnant women who have been diagnosed with anemia, it is advisable to meet the needs of adequate iron intake and see a doctor regularly so as to prevent the occurrence of LBW. In the future, it will be recommended for the researcher who will study the prevalence of suspected anemia in pregnancy to the incidence of LBW can pay more attention and examine other factors that can affect LBW.

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