Jurnal Kebidanan
UNIVERSITAS MUHAMMADIYAH SEMARANG

Jurnal Kebidanan – Vol 12, No 2 (2023), 117-124
ISSN 2301-8372 (print); ISSN 2549-7081 (online)
DOI: 10.26714/jk.12.2.2023.117-124

The Relationship between Anemia Status and Newborn Weight Outcomes

Ariyani Lutfitasari[1*], Sherkia Ichtiarsi Prakasiwi[2], Fitriani Nur Damayanti[3], Lia Mulyanti[4]

[1,2,3,4] Midwifery Study Program, Universitas Muhammadiyah Semarang, Indonesia

Abstract

Background: Anemia has been a crucial contributor to adverse pregnancy outcomes such as premature birth, low birth weight (BBLR), small for gestational age (IUGR), as well as delivery by cesarean section. Methodology: The method used is an analytical survey method with a cross-sectional approach. The population in this study is all mothers who gave birth in the working area of the Bangetayu Health Center in Semarang City from September 2021 to September 2022. The sampling technique uses Consecutive Sampling. Results: Chi-Square test results, there is a relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City (p-value = 0.001). Conclusion: Hemoglobin levels in pregnant women should be observed even from the first trimester of pregnancy to avoid a higher risk of adverse pregnancy outcomes.

Keywords: Low birth Weight (LBW), Anemia, pregnancy, newborn

Abstrak

Latar belakang :Anemia telah menjadi kontributor krusial untuk hasil kehamilan yang merugikanseperti kelahiran prematur, berat badan lahir rendah (BBLR), kecil untuk usia kehamilan (IUGR), serta persalinan dengan operasi Caesar. Metodologi: Metode yang digunakan adalah metode survei analitik dengan pendekatan cross sectional . Populasi dalam penelitian ini adalah seluruh ibu yang melahirkan di wilayah kerja Puskesmas Bangetayu Kota Semarang pada bulan September 2021 sampai dengan September 2022. Teknik pengambilan sampel menggunakan Consecutive Sampling. Hasil: Hasil uji Chi-Square, ada hubungan Status Anemia dengan Luaran Berat Badan Bayi Baru Lahir di Puskesmas Bangetayu Kota Semarang (p-value = 0,001). Kesimpulan: Kadar hemoglobin pada ibu hamil harus di perhatikan bahkan sejak trimester pertama kehamilan untuk menghindari risiko yang lebih tinggi dari hasil kehamilan yang merugikan.

Kata Kunci: BBLR, Anemia, kehamilan, bayi baru lahir

[*]**Corresponding Author:** Ariani Lutfitasari (email: ariyani_lutfitasari@unimus.ac.id), Jl. Kedungmundu No.18, Kedungmundu, Kec. Tembalang, Kota Semarang, Jawa Tengah 50273

Introduction

Anemia during pregnancy is a case of nutritional disorders in developing and developed countries. According to the World Health Organization (WHO), the proportion of the population suffering from anemia during pregnancy is 14% in developed countries and

51% in developing countries, and most cases are found in Africa and Southeast Asia (Lumbanraja et al., 2019). Anemia cases of pregnant women in Indonesia according to data from RISKESDAS, namely 48.9% of pregnant women have anemia and as many as 84.6% of anemia in pregnant women occurs in the age group of 15-24 years (Ministry of Health RI, 2022). Cases of pregnant women with anemia amounted to 15.4% in Semarang City in 2021 (Semarang City Health Office, 2021).

Anemia is one of the most common medical disorders during pregnancy and can cause serious adverse effects on the mother and fetus with a high risk of maternal death (Youssry et al., 2018). Anemia is a crucial contributor to adverse pregnancy outcomes such as premature birth, low birth weight (BBLR), small for gestational age (IUGR), as well as delivery by Caesarean section (Kant et al., 2018). During pregnancy, the fetus's need for iron increases the mother's daily iron needs about 10-fold, increasing from 6 mg/day to 22 mg/day in the first and third trimesters of pregnancy. This increased demand for iron is largely taken from maternal iron stores, which puts pregnant women at a higher risk of iron deficiency (Srour et al., 2018). The government's efforts in overcoming anemia in pregnant women are by giving blood-added tablets (TTD) of at least 90 tablets during pregnancy (Ministry of Health RI, 2022).

Research from Youssry et al., (2018) states that there is an increased risk of premature birth, low birth, low birth, and postpartum hemorrhage in mothers who experience anemia in their pregnancy. This study also states that the incidence of low birth weight babies is 9 times more common in pregnant women who are anemic compared to pregnant women who are not anemic. Higher hemoglobin levels can lower the risk of pregnancy complications. Good iron supply and normal Hemoglobin values have been shown to prevent perinatal and neonatal death (Iqbal et al., 2019). The results of research conducted by Widiyanto & Lismawati (2019) prove that there is a significant relationship between the amount of hemoglobin (Hb) and the incidence of low birth weight. Mothers who are anemic have a risk of their babies experiencing low birth weight events when compared to mothers who are not anemic. Lack of hemoglobin (Hb) will result in the growth of the baby because the blood cannot provide enough oxygen to all tissues. So that metabolic processes and the exchange of important nutrients in tissues are disturbed. This situation will affect

pregnant women and the fetus they contain. The state of anemia will affect the baby to be born.

Method

The method used is an analytical survey method with a cross-sectional approach. The population in this study is all mothers who gave birth in the working area of the Bangetayu Health Center in Semarang City from September 2021 to September 2022. The sampling technique uses Consecutive Sampling. In this study, the sample was a portion of the population taken by consecutive sampling. Sampling i.e. where each subject meeting the inclusion criteria is selected with the required sample size achieved. The inclusion criteria in this study are all pregnant women who gave birth to babies in the working area of the Bangetayu health center in Semarang City. The exclusion criteria in this study were incomplete patient medical records, multiple pregnancies, and stillbirths. Secondary data is obtained from the patient's medical record, then collected by midwives appointed by researchers as enumerators. Data collection using questionnaires and checklists provided by researchers. Data analysis using Chi-Square.

Result and Discussion

Anemia Status in Pregnant Women

Table 1. Frequency Distribution Based on Anemia Status of Pregnant Women at Bangetayu Health Center Semarang City

No	Status Anemia	Distribution	
		F	%
1.	Anemia	31	30.4
2.	not anemic	71	69.6
Total		102	100.0

Based on Table 1, it can be concluded that respondents who experience anemia as many as 31 respondents (30.4%), and those who do not experience anemia as many as 71 respondents (69.6%). Anemia in pregnancy is a hemoglobin level of <11 g / dL which can be classified into two, namely mild anemia (7-10.9 g / dL) and severe anemia (<7 g / dL). Anemia in pregnancy can be a risk factor for giving birth to a Low Birth Weight (BBLR) baby. BBLR can increase perinatal and neonatal mortality which affects impairment and development and decreased intellectual function (Mendrofa et al., 2020).

Research from Ningrum (2017) shows anemic pregnant women have a 9.3 times chance of having low birth weight compared to mothers without CI anemia 95% (2,180-39,962) Anemia in pregnant women can result in reduced oxygen supply to the tissues and will interfere with fetal growth, thus strengthening the risk of preterm labor and low birthweight. This is also by research conducted by Figueiredo et al. (2018) that

maternal anemia is associated with low birth weight with adjusted OR: 1.23 (95% CI: 1.06-1.43) and I2: 58%. In conclusion, maternal anemia is considered a risk factor for low birth weight. Anemia is a major public health problem worldwide, affecting more than 1.6 billion people. Anemia has been associated with an increased risk of maternal and infant mortality, neurodevelopmental disorders in the child, and decreased cognitive function and physical work capacity later in life (Finkelstein et al., 2020).

Pregnant women who had enough iron in the 1st trimester experienced a decrease in iron concentration but still maintained a higher iron status in the 2nd trimester compared to pregnant women who were iron deficient in the 1st trimester. However, in the 3rd trimester, early pregnancy expectant mothers with iron deficiency as well as in early pregnancy with enough iron have comparable iron status. This reflects the physiology of pregnancy in the 3rd trimester where maternal iron is rapidly mobilized to meet fetal transfer needs, and the administration of iron supplements during the 1st trimester for women diagnosed with anemia but not given until the 2nd trimester of pregnancy (Pobee et al., 2021).

Newborn Weight Outcomes

Table 2. Frequency Distribution Based on Newborn Weight Bangetayu Health Center Semarang City.

No	Incidence of Low birth weight	Distribution	
		F	%
1.	LBW	30	29,4
2.	Normal	72	70,6
	Total	102	100.0

Based on Table 2, it can be concluded that as many as 30 respondents have low birth weight babies (29.4%) and 72 respondents are not low birth weight (70.6%). Research from Srour et al., (2018) states that newborns born to mothers with low Hb levels tend to have lower body weight and birth height, head circumference, and lower gestational age. Anemia in pregnancy can adversely affect both the mother and the fetus. Anemia in pregnancy will disrupt oxygenation and nutritional supply from the mother to the fetus. As a result, the fetus will experience weight gain disorders resulting in low weight (Novianti et al., 2018). The fetus is at risk of premature labor and low birth weight due to impaired oxygen delivery to the placenta and fetus. (Kavya.N et al., 2022).

The Relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City

Table 3. Relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City

Anemia Status	LBW				Total		P Value
	LBW		Normal		F	%	
	F	%	F	%			
Anemia	16	51.6%	15	48.4%	31	100%	0.001
No Anemic	14	19.7%	57	80.3%	67	100%	
Total	30	29,4%	72	70,6%	102	100%	

Based on Table 3, it can be concluded that respondents who experience anemia mostly have babies who are low birthweight, namely as many as 16 respondents (51.6%), and respondents who do not experience SEZ mostly do not give birth to BBLR babies, which is as many as 57 respondents (80.3%). Based on the results of the *Chi-Square test*, there is a relationship between Anemia Status and Newborn Weight Outcomes at Bangetayu Health Center Semarang City (p-value = 0.001).

This is in line with research conducted by Asaf et al., (2022) which states that pregnant women with low Hb levels tend to give birth to babies with a birth weight of less than 2500 grams. The study concluded that there was a strong association between birth weight and Hb levels (p-value = 0.038). Hemoglobin levels were positively correlated with fetal birth weight (r= 0.631, p-value=0.0001). Research from Liu et al., (2022) found that maternal hemoglobin concentration in the third trimester is associated with low and low pregnancy risk (KMK). Pregnant women with severe anemia or hemoglobin > 130 g / L in the third trimester can significantly lose neonatal birth weight and increase the risk of low birth weight and small gestation (KMK). Low and high hemoglobin concentrations in the third trimester can have adverse effects on fetal weight growth (Liu et al., 2022a).

Research from Sah et al., (2022) shows that mothers who have low hemoglobin concentrations have a higher chance of having low hemoglobin babies compared to mothers who have normal hemoglobin levels. Pregnant women who experience anemia during pregnancy have a

3.42 higher chance of giving birth to BBLR babies compared to mothers who do not have anemia (Azizah et al, 2022). A low hemoglobin level inhibits the delivery of oxygen and nutrients to the fetus by the mother, as well as the body's oxygen supply and placental growth. This unfavorable impact occurs in persistent fetal hypoxia and inadequate nutrient intake, leading to poor fetal weight gain and birth outcomes such as low birth weight (Randall et al., 2019).

Anemia during pregnancy increases the occurrence of maternal health disorders and birth outcomes. A strategy that can be done to reduce anemia is the provision of iron supplementation during pregnancy and in women of childbearing age (Kabir et al., 2022). The speed of fetal weight growth reaches its peak in the third trimester (around 35 weeks gestation) accompanied by a sharp increase in fetal nutritional needs. Severe anemia or relatively high hemoglobin concentration in this period can lead to a very inadequate supply of maternal nutrients to the fetus, which seriously affects fetal weight growth and increases the risk of low weight (Liu et al., 2022)

Conclusion

Hemoglobin levels in pregnant women should be observed even from the first trimester of pregnancy to avoid a higher risk of adverse pregnancy outcomes. For this reason, the need for anemia screening in couples who will plan a pregnancy.

References

Asaf, M., Ilyas, M. K., Qasim, T., Irfan, S., Shoaib, A., & Chachar, A. Z. K. (2022). Maternal Hemoglobin and Its Relationship With fetal birth weight. *Pakistan Journal of Medical and Health Sciences*, *16*(8), 148–150. https://doi.org/10.53350/pjmhs22168148

Azizah, F. K., Dewi, Y. L. R., & Murti, B. (2022). The Effect of Maternal Anemia on Low Birth Weight: A Systematic Review And Meta Analysis. *Journal of Maternal and Child Health*, *7*(1), 34–43. https://doi.org/10.26911/thejmch.2022.07.01.04

Figueiredo, A. C. M. G., Gomes-Filho, I. S., Silva, R. B., Pereira, P. P. S., Da Mata, F. A. F., Lyrio, A. O., Souza, E. S., Cruz, S. S., & Pereira, M. G. (2018). Maternal anemia and low birth weight: A systematic review and meta-analysis. *Nutrients*, *10*(5), 601. https://doi.org/10.3390/nu10050601

Finkelstein, J. L., Kurpad, A. V., Bose, B., Thomas, T., Srinivasan, K., & Duggan, C. (2020). Anaemia and iron deficiency in pregnancy and adverse perinatal outcomes in Southern India. *European Journal of Clinical Nutrition*, *74*(1), 112–125. https://doi.org/10.1038/s41430-019-0464-3

Kabir, M. A., Rahman, M. M., & Khan, M. N. (2022). Maternal anemia and risk of

adverse maternal health and birth outcomes in Bangladesh: A nationwide population-based survey. *PLoS ONE*, *17*(12 December), e0277654. https://doi.org/10.1371/journal.pone.0277654

Kavya.N, K. ., Kugananthan, M., & Ramakrishnan, S. (2022). The study of morphology of placenta in anaemic subjects in south Indians. *International Journal of Health Sciences*, 1994–2001. https://doi.org/10.53730/ijhs.v6ns7.11738

Liu, D., Li, S., Zhang, B., Kang, Y., Cheng, Y., Zeng, L., Chen, F., Mi, B., Qu, P., Zhao, D., Zhu, Z., Yan, H., Wang, D., & Dang, S. (2022a). Findings from a Prospective Study in Northwest China. *Nutrients*, *14*(858), 3–16.

Liu, D., Li, S., Zhang, B., Kang, Y., Cheng, Y., Zeng, L., Chen, F., Mi, B., Qu, P., Zhao, D., Zhu, Z., Yan, H., Wang, D., & Dang, S. (2022b). Maternal Hemoglobin Concentrations and Birth Weight, Low Birth Weight (LBW), and Small for Gestational Age (SGA): Findings from a Prospective Study in Northwest China. *Nutrients*, *14*(4), 858. https://doi.org/10.3390/nu14040858

Mendrofa, T. I. R., Hutasoit, E. S. P., & Syahrir, L. (2020). Hubungan Anemia pada Kehamilan dengan Kejadian Berat Badan Lahir Rendah. *Jurnal Kedokteran Methodist*, *4*(4), 519.

Ningrum, E. W. (2017). Korelasi Antara Status Gizi Anemia Dengan Berat Badan Dan Panjang Badan Bayi Baru Lahir. *Jurnal Viva Medika*, *10*(1), 28–33.

Novianti, S., Aisyah, I. S., Studi, P., Masyarakat, K., Kesehatan, I., & Siliwangi Tasikmalaya, U. (2018). *Hubungan Anemia Pada Ibu Hamil Dan Bblr*. *4*(1), 6–8.

Pobee, R. A., Setorglo, J., Klevor, M., & Murray-Kolb, L. E. (2021). The prevalence of anemia and iron deficiency among pregnant Ghanaian women, a longitudinal study. *PLoS ONE*, *16*(3 March), e0248754. https://doi.org/10.1371/journal.pone.0248754

Randall, D. A., Patterson, J. A., Gallimore, F., Morris, J. M., Simpson, J. M., McGee, T. M., & Ford, J. B. (2019). Haemoglobin trajectories during pregnancy and associated outcomes using pooled maternity and hospitalization data from two tertiary hospitals. *Vox Sanguinis*, *114*(8), 842–852. https://doi.org/10.1111/vox.12839

Sah, S. K., Sunuwar, D. R., Baral, J. R., Singh, D. R., Chaudhary, N. K., & Gurung, G. (2022). Maternal hemoglobin and risk of low birth weight: A hospital-based cross-sectional study in Nepal. *Heliyon*, *8*(12), e12174. https://doi.org/10.1016/j.heliyon.2022.e12174

Srour, M. A., Aqel, S. S., Srour, K. M., Younis, K. R., & Samarah, F. (2018). Prevalence of Anemia and Iron Deficiency among Palestinian Pregnant Women and Its Association with Pregnancy Outcome. *Anemia*, *2018*. https://doi.org/10.1155/2018/9135625

This page itentionally left blank