

The Relationship between Pregnancy Complications and the Incidence of Anemia in Expectant Mothers

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Abstract: Anemia is a global health problem that often occurs in pregnant women. Inadequate pregnancy spacing can contribute to the risk of anemia. This study aims to analyze the relationship between pregnancy spacing and the incidence of anemia in pregnant women. This type of research is observational analytic with a case-control design. This study was conducted from February to October 2024 at a selected health center in the region. The case-control design was chosen to investigate the causes of anemia during pregnancy, particularly focusing on the effects of pregnancy spacing. The number of samples used was 30 cases, while 30 control cases were selected by simple random sampling from a larger pool of eligible pregnant women. The analysis employed the chi-square test to determine the statistical significance of the relationship between pregnancy spacing and the incidence of anemia. Results showed that 21.7% of respondents had anemia, with a significantly higher prevalence in those with a pregnancy spacing of less than two years. After conducting the chi-square test, the result yielded a significant p-value of 0.002, indicating a strong association between short pregnancy intervals and anemia. This finding highlights the potential risks associated with inadequate pregnancy spacing, emphasizing the importance of family planning and prenatal care in preventing anemia in expectant mothers. The study suggests that adequate pregnancy spacing may reduce the incidence of anemia, thus promoting healthier pregnancy outcomes. Furthermore, it underscores the need for educational programs aimed at raising awareness of the benefits of proper pregnancy planning. Such initiatives would not only help prevent anemia but also improve maternal and fetal health. Comprehensive health policies promoting spacing between pregnancies can have long-term positive effects on maternal well-being.

Keywords: Anemia; Parity; Pregnancy spacing

1. Introduction

Anemia is one of the common health problems faced by pregnant women, which can have a negative impact on the health of the mother and fetus. According to data from the World Health Organization (WHO), the prevalence of anemia among pregnant women in developing countries reaches 38% (WHO, 2021). One of the factors that contributes to the occurrence of anemia is the spacing between pregnancies. Pregnancy spacing that is too close can cause the mother's body to not have enough time to recover from the previous pregnancy, increasing the risk of anemia.

The ideal pregnancy spacing, according to WHO recommendations, is 24 months between birth and the next pregnancy. Research shows that a pregnancy spacing of less than 18 months can increase the risk of anemia by up to 30% (Zuliyanti, 2022). This is due to the increased nutritional needs during pregnancy and breastfeeding, which often cannot be met if pregnancy occurs too quickly. A study in Indonesia showed that 23% of pregnant women with a pregnancy spacing of less than two years experienced anemia (Yaya, 2020).

In the context of public health, it is important to understand the relationship between pregnancy spacing and the incidence of anemia in order to formulate appropriate interventions. Health programs that target awareness of the importance of healthy pregnancy

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spacing may help reduce the prevalence of anemia among pregnant women. This study aims to further explore the relationship between pregnancy spacing and the incidence of anemia, as well as other factors that may contribute to this problem.

Pregnancy spacing refers to the time interval between one pregnancy and the next. This distance is usually measured in years or months and has significant implications for maternal and child health. According to the World Health Organization (WHO), the ideal pregnancy spacing is at least 2 years between the birth of a child and the next pregnancy to reduce the risk of complications that may arise, including anemia (WHO, 2018). Anemia, on the other hand, is a medical condition characterized by low levels of hemoglobin in the blood, which can cause a variety of serious health problems, especially for the pregnant mother and the developing fetus.

Anemia in pregnant women is often caused by a deficiency of iron, which is an essential nutrient for the formation of red blood cells. When a pregnant woman has too close a pregnancy spacing, her body may not have fully recovered from the previous pregnancy, increasing the risk of anemia. Research shows that women who have a pregnancy interval of less than 2 years are more likely to experience anemia compared to those who have a longer pregnancy interval (Bhatti, 2023).

Data from the Ministry of Health of the Republic of Indonesia shows that the prevalence of anemia in pregnant women in Indonesia is still quite high, reaching 48% in 2021 (Ministry of Health of the Republic of Indonesia, 2021). This shows the importance of attention to pregnancy intervals as a risk factor that can affect maternal health and fetal development. In addition, anemia during pregnancy not only affects maternal health but can also contribute to low birth weight and increase the risk of perinatal death (Amalina, 2023).

Case examples in several regions in Indonesia show that mothers who give birth in close time intervals often experience fatigue and lack of adequate nutritional intake, which are factors that cause anemia. In a study conducted in Central Java, it was found that mothers who had a pregnancy interval of less than 2 years had lower hemoglobin levels compared to those who had an interval of more than 2 years (Kusumastuti, 2023). This emphasizes the importance of understanding pregnancy spacing in efforts to prevent anemia among pregnant women.

Thus, identification of pregnancy spacing and understanding of anemia are essential in reproductive health planning. Efforts to raise awareness of the importance of healthy pregnancy spacing should be part of public health programs, especially in countries with high rates of anemia such as Indonesia. The incidence of anemia in pregnant women is an important indicator of maternal health. Worldwide, WHO estimates that around 41% of pregnant women experience anemia, with the highest prevalence occurring in developing countries (WHO, 2021). In Indonesia, the latest data shows that the prevalence of anemia in pregnant women reaches 48%, indicating that almost half of pregnant women in this country experience this condition (Ministry of Health of the Republic of Indonesia, 2021). This figure

indicates the need for more effective interventions to address the problem of anemia among pregnant women.

2. Proposed Method

This type of research is observational analytic with a case-control design. This study was conducted from February to October 2024. This study design used a case-control to study the causes of anemia during pregnancy. The number of samples used was 30 cases, while 30 control cases were selected by simple random sampling to control confounding variables, with inclusion and exclusion criteria. The inclusion criteria in this study were the age of pregnant women 20-35 years, normal BMI. The sampling technique in this study was simple random sampling for both case and control groups. The dependent variable is the incidence of anemia. The independent variable is the pregnancy interval. The research instrument in this study used secondary data by looking at medical records, namely the mother's KIA book and cohort records at the health center. The analysis method used was univariate, bivariate with Chi-square

3. Results

Table 1. Frequency Distribution of Respondents of Anemia Incidents

Dependent variabel	Frekuensi (f)	Persen (%)
Anemia	30	50
Normal	30	50
Jumlah	60	100%

Table 2. Frequency Distribution of Respondents Based on Pregnancy Spacing

Independent variabel	Frekuensi (f)	Persen (%)
Pregnancy interval ≤ 24 bulan	20	33,4
Pregnancy interval > 24 bulan	40	66.6
Total	60	100%

Table 2. Shows that the majority of respondents had a pregnancy interval of > 24 months (66.6%).

Table 3. Relationship between pregnancy interval and the incidence of anemia

Anemia occurrence								
Pregnancy interval	Normal		anemia		Total		ρ (Sig)	
	f	%	f	%	f	%	0.002	
	≤24 months	7	11,6	13	21,7	20		33,4
	>24 months	23	38,4	17	28,3	40		66.6
	Total	30	50	30	50	60		100%

Table 3 shows that 21.7% of respondents with a pregnancy interval of ≤ 24 months experienced anemia. After the chi-square test was conducted in the Hsil test, the significant

relationship between pregnancy interval and the incidence of anemia was p (Sig) 0.002 (<0.05).

5. Discussion

Based on the results of the study, it was found that 21.7% of respondents with a pregnancy interval of ≤ 24 months experienced anemia. After the chi-square test was carried out in the Hsil test, the significant relationship between pregnancy interval and stunting was p (Sig) 0.002 (<0.05). This is in line with previous findings showing that short pregnancy intervals contribute to an increased risk of anemia (Hutcheon, 2019). Further analysis showed that women with a pregnancy interval of less than 18 months had a 2.5 times higher risk of anemia compared to those with a pregnancy interval of more than 24 months. This shows the importance of providing education to married couples about family planning and the importance of healthy pregnancy intervals to prevent anemia and other complications during pregnancy. In addition, other factors such as nutritional status, access to health services, and education levels also play an important role in the incidence of anemia among pregnant women. Studies have shown that pregnant women with higher levels of education tend to have better knowledge about nutrition and health care, which can contribute to a lower risk of anemia (Victoria, 2019).

Pregnancy spacing can be defined as the time interval between the last birth and the next pregnancy. Previous studies have shown that short pregnancy spacing is associated with various health complications, including anemia. According to a study conducted by Kemppinen (2022), women who have a pregnancy spacing of less than two years have a higher risk of anemia compared to those who have a pregnancy spacing of more than two years.

Anemia in pregnant women is generally caused by iron deficiency, which can occur due to blood loss during childbirth, increased iron requirements during pregnancy, and lack of intake of iron-rich foods. A study conducted in Central Java found that 60% of pregnant women who experienced anemia also had short pregnancy spacing (Onwuka, 2020). This suggests that inadequate pregnancy spacing can contribute to malnutrition, especially iron.

In addition, socioeconomic factors also influence the relationship between pregnancy spacing and the incidence of anemia. Women from low-income backgrounds tend to have limited access to health services and nutrition education, which can exacerbate the risk of anemia. According to data from the Indonesian Central Statistics Agency (BPS), the prevalence of anemia is higher in pregnant women from poor families compared to those from well-off families (BPS, 2020).

Anemia in pregnant women can be caused by various factors, including iron deficiency, infection, and other medical conditions. Iron deficiency is the most common cause of anemia in pregnancy, which is often caused by inadequate nutritional intake and increased iron requirements during pregnancy (Arfan, 2024). Research shows that pregnant women who

experience anemia have a higher risk of complications such as premature birth, postpartum hemorrhage, and even maternal death (Riyanto, 2017).

Statistics show that anemia not only affects the health of the mother, but also the health of the baby. Babies born to mothers with anemia are more likely to have low birth weight and a higher risk of neonatal death (Black et al., 2013). Therefore, monitoring and treating anemia in pregnant women is very important to ensure maternal health and optimal development for the baby.

Case studies in several hospitals in Indonesia show that pregnant women who do not receive routine iron supplementation have a higher risk of anemia. In a study conducted at a hospital in Jakarta, it was found that 60% of pregnant women who did not take iron supplements experienced anemia, compared to only 20% of those who routinely took supplements (Maulina, 2024). This shows the importance of education and access to iron supplementation for pregnant women.

In order to reduce the incidence of anemia in pregnant women, collaboration between the government, health workers, and the community is needed to raise awareness of the importance of balanced nutrition, iron supplementation, and health monitoring during pregnancy. Programs that focus on improving the nutrition and health of pregnant women should be a priority in efforts to reduce the incidence of anemia in Indonesia.

The relationship between too close pregnancy spacing and the incidence of anemia in pregnant women has been the focus of research in various countries. A pregnancy spacing of less than 2 years can cause the mother's body to not have enough time to recover from the previous pregnancy, which can result in decreased hemoglobin levels and an increased risk of anemia. Research conducted by Nazir (2019) shows that women with short pregnancy spacing have a 1.5 times higher risk of experiencing anemia compared to those with longer pregnancy spacing.

A longitudinal study in Indonesia involving more than 1,000 pregnant women showed that those who had a pregnancy interval of less than 2 years had a higher prevalence of anemia, namely 52%, compared to 28% in pregnant women with a pregnancy interval of more than 2 years (Gurmu, 2022). This suggests that close pregnancy spacing can significantly contribute to the increased incidence of anemia among pregnant women.

Other factors that may contribute to this relationship include poor nutritional intake and low access to health services. Pregnant women who have close pregnancy intervals are often unable to meet the increased nutritional needs during pregnancy, which can worsen the risk of anemia. A study in Yogyakarta showed that 70% of pregnant women with close pregnancy intervals were iron deficient, which contributed to anemia (Weiss, 2021).

In addition, pregnancies that are too close together can also increase physical and emotional stress in the mother, which can affect diet and overall health. High stress can cause the mother to not pay attention to the nutritional intake needed during pregnancy, thereby

increasing the risk of anemia. Research shows that low social support and psychological stress can worsen anemia in pregnant women (Noor, 2018).

By understanding the relationship between pregnancy spacing and anemia, more appropriate interventions can be designed to improve maternal health. Educational programs that emphasize the importance of family planning and healthy pregnancy spacing should be part of efforts to prevent anemia among pregnant women. In addition, access to health services and iron supplementation should also be strengthened to reduce the risk of anemia in pregnant women with close pregnancy spacing.

6. Conclusions

In conclusion, the relationship between pregnancy spacing and anemia incidence is a complex and important health issue to consider. Too close a pregnancy spacing can increase the risk of anemia in pregnant women, which in turn can hurt maternal and infant health. Existing data and research show that the prevalence of anemia in pregnant women in Indonesia is still high, and non-ideal pregnancy spacing contributes to this problem. The importance of family planning and awareness of healthy pregnancy spacing should be emphasized in public health programs. In addition, support for adequate nutritional intake and access to quality health services are also needed to reduce the risk of anemia among pregnant women. Collaborative efforts between various stakeholders, including the government, health workers, and the community, will be essential in achieving this goal.

References

- Amalina, L. N. (2023). Incidence of anemia in pregnant women with closer spacing of pregnancies and multiparity: A case report. *Bioscientia Medicina: Journal of Biomedicine and Translational Research*, 7(9), 3561-3565. <https://doi.org/10.37275/bsm.v7i9.858>
- Arfan, I., Marlenywati, M., Saleh, I., Rizky, A., & Marlina, M. (2024). The risk factors for anemia in women at third trimester of pregnancy in the primary health center of Tanjung Sekayam: A case-control study. <https://doi.org/10.20473/amnt.v8i1SP.2024.37-44>
- Bhatti, T. N., Naeem, M., Akhtar, N. U., & Hanif, A. (2023). Impact of short birth spacing on maternal anemia at district head quarters hospital Nankana Sahib: Impact of short birth spacing. *Pakistan BioMedical Journal*, 08-12. <https://doi.org/10.54393/pbmj.v6i11.960>
- Gurmu, L., Wakgari, N., Kolola, T., & Danusa, K. T. (2022). Effect of short inter-pregnancy interval on perinatal outcomes among pregnant women in North-west Ethiopia: A prospective cohort study. *Frontiers in Public Health*, 10, 953481. <https://doi.org/10.3389/fpubh.2022.953481>
- Hutcheon, J. A., Nelson, H. D., Stidd, R., Moskosky, S., & Ahrens, K. A. (2019). Short interpregnancy intervals and adverse maternal outcomes in high-resource settings: An updated systematic review. *Paediatric and Perinatal Epidemiology*, 33(1), O48-O59. <https://doi.org/10.1111/ppe.12518>
- Kemkes RI. (2021). *Laporan Kesehatan Ibu dan Anak 2021*. Kementerian Kesehatan Republik Indonesia.
- Kemppinen, L., Mattila, M., Ekholm, E., Huolila, L., Pelto, J., Karlsson, H., ... & Karlsson, L. (2022). Gestational anemia and maternal antenatal and postpartum psychological distress in a prospective FinnBrain Birth Cohort Study. *BMC Pregnancy and Childbirth*, 22(1), 704. <https://doi.org/10.1186/s12884-022-05032-z>
- Kusumastuti, T., Putri, D. P., Eliza, C. P., & Hanifah, A. N. (2023). KEK pada ibu hamil: Faktor risiko dan dampak. *Jurnal Kesehatan Tambusai*, 4(3), 2719-2726.
- Mahande, M. J., & Obure, J. (2016). Effect of interpregnancy interval on adverse pregnancy outcomes in northern Tanzania: A registry-based retrospective cohort study. *BMC Pregnancy and Childbirth*, 16, 1-9. <https://doi.org/10.1186/s12884-016-0929-5>
- Maulina, R., Alfitri, R., & Amalia, W. (2023). Impact of micronutrient supplementation on hemoglobin, ferritin, and retinol status in stunting children under 5 years in urban poor regions.
- Nazir, I. I., Alharthi, B. A., & Althomali, H. A. (2019). Short inter-pregnancy interval as a risk factor for anaemia in pregnancy. *EC Microbiology*, 15, 148-157.
- Noor, T., Maheen, E., & Latif, F. (2018). Association of short interpregnancy interval (IPI) with maternal anemia at a tertiary care hospital. *J Med Physiol Biophys*, 40, 36-39.
- Onwuka, C. C., Ugwu, E. O., Obi, S. N., Onwuka, C. I., Dim, C. C., Eleje, G. U., ... & Ozumba, B. C. (2020). Effects of short interpregnancy interval on maternal and perinatal outcomes: A cohort study of pregnant women in a low income country. *Nigerian Journal of Clinical Practice*, 23(7), 928-933. https://doi.org/10.4103/njcp.njcp_423_19

- Riyanto, D. L., Herdian, F. S., Sugiarta, G. Y., Panjaitan, H. P., Naomi, K. A., Hanifi, M., ... & Purwosunu, Y. (2017). Short interpregnancy interval as a risk factor for anemia in pregnancy: A retrospective cohort study in Duren Sawit, Jakarta, 2014-2016. *Advanced Science Letters*, 23(7), 6828-6830. <https://doi.org/10.1166/asl.2017.9408>
- Victora, C. G., Christian, P., Vdaletti, L. P., Gatica-Domínguez, G., Menon, P., & Black, R. E. (2021). Revisiting maternal and child undernutrition in low-income and middle-income countries: Variable progress towards an unfinished agenda. *The Lancet*, 397(10282), 1388-1399. [https://doi.org/10.1016/S0140-6736\(21\)00394-9](https://doi.org/10.1016/S0140-6736(21)00394-9)
- Weiss, A., Sela, H. Y., Rotem, R., Grisaru-Granovsky, S., & Rottenstreich, M. (2021). Recurrent short interpregnancy interval: Maternal and neonatal outcomes. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 264, 299-305. <https://doi.org/10.1016/j.ejogrb.2021.07.040>
- World Health Organization (WHO). (2021). *Global Nutrition Targets 2025: Anaemia Policy Brief*.
- Yaya, S., Uthman, O. A., Ekholuenetale, M., Bishwajit, G., & Adjiwanou, V. (2020). Effects of birth spacing on adverse childhood health outcomes: Evidence from 34 countries in sub-Saharan Africa. *The Journal of Maternal-Fetal & Neonatal Medicine*, 33(20), 3501-3508. <https://doi.org/10.1080/14767058.2019.1576623>
- Zuliyanti, N. I. (2022). Hubungan jarak kehamilan dengan kejadian anemia pada ibu hamil trimester III di Puskesmas Bagelen Kabupaten Purworejo. *Jurnal Komunikasi Kesehatan*, 13(1), 1-8. <https://doi.org/10.56772/jkk.v13i1.217>