

## Relationship Between Anemia in Pregnancy and Postpartum Hemorrhage

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### Abstract

**Introduction:** Postpartum hemorrhage is one of the causes of maternal death. Postpartum hemorrhage occurs when blood loss is >500 ml. Bleeding is an obstetric emergency and must immediately receive appropriate treatment. Anemia is a risk factor for postpartum hemorrhage. The global prevalence of anemia in pregnant women in 2011 was based on data from the World Health Organization. Pregnant women throughout the world who experienced anemia were 38.2%. Southeast Asia has the highest ranking, namely 48.7%. Anemia is a global problem and occurs frequently in developing countries. This study aims to further investigate the relationship between anemia and the incidence of postpartum hemorrhage.

**Method:** This study is a literature review. The articles sourced from Google Scholar and selected articles based on certain inclusion criteria. The selected articles present original research findings regarding the relationship between anemia and the incidence of postpartum hemorrhage. The articles were published between 2020-2024.

**Result and Discussion:** From the literature research, 10 articles met the inclusion criteria. Review from 10 articles showed that there was a relationship between anemia and the incidence of postpartum hemorrhage. Pregnancies with anemia have a 11.253 times greater risk of postpartum hemorrhage than non-anemic mothers

**Conclusion:** Mothers with anemia have a higher risk of postpartum hemorrhage than non-anemic mothers. It is hoped that pregnant women and midwives can regularly monitor anemia status to prevent complications in the future.

**Keywords:** Anemia; Pregnancy; Risk Factor; Postpartum Hemorrhage; Bleeding

### 1. Introduction

Postpartum hemorrhage is one of the causes of maternal death. Postpartum hemorrhage occurs when blood loss is >500 ml in normal delivery or >1000 ml in caesarean delivery. Bleeding is an obstetric emergency and must immediately receive appropriate treatment. The maternal mortality rate (MMR) in Indonesia in 2022 will be 3,572, 741 of which will be caused by bleeding, which makes HPP ranked 2nd after hypertension [1]. Anemia is a risk factor for postpartum hemorrhage. Anemia in pregnant women in Indonesia is relatively high, namely at 48.9% [2]. The global prevalence of anemia in pregnant women in 2011 based on data from the World Health Organization, pregnant women around the world experienced it was 38.2% [3]. Southeast Asia has the highest ranking, namely 48.7%. Anemia is a global problem and occurs frequently in developing countries.

Anemia in pregnant women occurs if the hemoglobin level is <11 g/dl [4]. Pregnant women are susceptible to anemia because there is an increase in blood plasma and erythrocyte volume [5]. An increase in plasma volume which is much higher than erythrocytes causes a process of blood thinning as physiological compensation in pregnant women. Low hemoglobin levels if not treated can interfere with the mother's oxygen supply. Anemia not only threatens mothers but also babies who are at risk of morbidity, premature birth and LBW. Postpartum bleeding can be influenced by factors

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such as anemia, maternal age, parity, infectious diseases, chronic malnutrition, eclampsia, birth spacing, and history of previous births.

Bleeding can occur due to tone, trauma, tissue, thrombin factors. Uterine atony (tonus) is the most common cause of postpartum hemorrhage [6]. Anemia during labor can cause hypovolemic shock which can threaten the mother's safety due to large blood loss. Low hemoglobin levels during anemia reduce the flow of blood and oxygen to the placenta, uterus and fetus, causing weakening of the uterine muscles. Weak uterine muscles have an impact on weakening uterine contractions so that bleeding will continue and be difficult to stop.

This study aims to further investigate the relationship between anemia and the incidence of postpartum hemorrhage. This review aims to increase the knowledge of health workers, especially midwives, to anticipate postnatal bleeding by monitoring risk factors that can cause postnatal bleeding. Anticipation is useful in reducing morbidity and mortality in mothers and babies.

## 2. Material and methods

This article is a literature review by examining 10 selected articles based on certain inclusion criteria. The selected articles present original research findings regarding the relationship between anemia and the incidence of postpartum hemorrhage. The articles were published between 2020-2024 (in the last 4 years) using 5 articles in English and 5 articles in Indonesian. The exclusion criteria in this article were all articles that discussed anemia with postpartum hemorrhage using methods other than the original research. The articles used are sourced from Google Scholar. Articles were analyzed descriptively including author and year of publication, research location, research methods, research subjects, and research findings.

## 3. Results

Ten articles have been reviewed and analyzed as follows.

**Table 1** Results of Review of 10 Articles

No	Author	Research Title	Location	Method	Subject	Result
1	Ambarika R, Yalastyarini EA (2021)	Analisis Faktor-Faktor Yang Mempengaruhi Terjadinya Kegawatdaruratan Hemorrhagic Post Partum (HPP)	Poncokusumo Community Health Center	Quantitative analysis with a cross sectional design	20 mothers who experienced postpartum hemorrhage	The results obtained were that 75% experienced HPP, including 15% without anemia, 35% mild anemia, and 25% moderate anemia. p value = 0.045. There is a relationship between the anemia factor and the incidence of post partum hemorrhage [7].
2	Fegita P, Anwar HK (2024)	Karakteristik Kejadian Hemorrhagic Post Partum (HPP) pada Ibu di RSUPDr. M. Djamil Padang Tahun 2019-2022	RSUP Dr. M. Djamil Padang	Descriptive categorical with cross sectional design	54 mothers who experienced postpartum hemorrhage	The research results showed that HPP patients most often occurred in mothers with anemia (Hb <11 grams) as much as 88.9% [8].
3	Mayasari DK, Setiawandari, Waroh YK (2023)	Analisis Faktor-Faktor Yang Mempengaruhi Kejadian Hpp Di Kabupaten Bangkalan	Bangkalan Regency	Retrospective descriptive with a case control study design	124 post partum mothers who experienced bleeding and did not	The results of the study showed that 54 (91.5%) mothers experienced postpartum bleeding, with a p value = 0.001, so anemia

					experience bleeding	was significant in the incidence of HPP [9].
4	Sulpat E, Kusumaningrum AT, Harianto S, Mardhika A, Fadliyah L, MT AP (2024)	Kejadian Anemia Kehamilan Dengan Perdarahan Postpartum	Bulutigo Laren Lamongan Village	Case control study with a retrospective observational approach	146 postpartum mothers with case and control groups	The results showed that 62 (84.9%) anemic mothers experienced postpartum bleeding. The p value = 0.000 was obtained which shows that there is a relationship between anemia and the incidence of postpartum hemorrhage [10].
5	Lenau M, Hardiningsih EF, Hartati D, Sulistyorini C (2023)	Hubungan Anemia pada Kehamilan dengan Kejadian Perdarahan Pasca Bersalin dan BBLR di RSUD dr. Abdul Rivai	Abdul Rivai Regional Hospital, Berau Regency	Observational Analytical with cross sectional method	96 women gave birth normally who had a history of anemia at RSUD dr. Abdul Rivai Berau Regency January-October 2022	There were 56 (58.3%) mothers with anemia who experienced postpartum hemorrhage with a p value = 0.011, which indicates that there is a relationship between anemia and the incidence of postpartum hemorrhage [11].
6	Ariyanti R, Febrianti S, Qasim M, Jalilah NH (2022)	The Effect of Anemia in Pregnancy on Postpartum Hemorrhage	Juata Tarakan Health Center	Analytic survey with a retrospective design	271 pregnant women who visited the obstetrics and gynecology polyclinic in 2020	The incidence of postpartum hemorrhage is 12.9% with p value (OR=11,253, 95%CI 5,120-24,732). Mothers with anemia in pregnancy own a higher risk of postpartum hemorrhage which was 11.253 times greater than mothers who were not anemic in pregnancy [12].
7	Syamsuriyati, Handayani R, Syarif S, Triananinsi N, Sunartono (2024)	Anemia during Pregnancy and its Influence on Postpartum Hemorrhage	Bahonsuai Community Health Center, Morowali Regency	Prospective cohort analysis	30 postpartum mother (15 case groups and 15 control groups)	The results of the analysis showed that 76.5% of mothers who experienced anemia during pregnancy experienced postpartum hemorrhage (p<0.001) [13].
8	Nugroho FL, Ariningtyas ND, Rezkita YAA, Budinurdjaja P, Anas M (2021)	Relationship of Anemia in Pregnancy with Postpartum Hemorrhage in Jombang Regional Hospital	Jombang Regional Hospital	Analytic research with case control approach	36 pregnant who experienced hemorrhage at Jombang Regional Hospital in 2016-2019 and 36 pregnant who did not experienced hemorrhage at Jombang Regional	24 anemic pregnant women in the mild anemia category experienced postpartum bleeding. Anemia is associated with the incidence of postpartum hemorrhage with a p value = 0.000 [14].

					Hospital in 2016-2019	
9	Mawaddah M, Siregar ES (2024)	The Relationship of Anemia During Pregnancy and The Incident of Postpartum Bleeding at The Pratama Evi Clinic, Medan Marelan District, Medan City, North Sumatra, 2023	Pratama Evi Clinic, Medan Marelan District, Medan City, North Sumatra	Correlational descriptive with a cross sectional approach	30 postpartum mothers	Minority anemia as many as 13 people (43.3%) and the majority who experienced postpartum bleeding were 16 people (53.3%) with a p value = 0.000 so it was found that there was a relationship between anemia and the incidence of postpartum bleeding [15].
10	Ma'rifah A, Suryantini NP (2023)	Anemia Prenatal is a Risk Factor for Postpartum Hemorrhage	Sukodono Health Center, Sidoarjo	Observational study with a cross sectional approach	42 respondents was obtained with the following inclusion criteria	It was found that of 30 mothers with postpartum hemorrhage, 18 of them had anemia with a p value = 0.008, so there was a relationship between anemia and the incidence of postpartum hemorrhage in Sukodono Health Center, Sidoarjo [16].

#### 4. Discussion

The results of the literature review showed that there was a relationship between anemia and the incidence of postpartum hemorrhage. Fegita and Anwar's [8] findings showed that 48 out of 54 anemic mothers experienced postpartum bleeding. This is directly proportional to research by Aneisca and Batubara [17] which proves that there is a relationship between anemia and postpartum hemorrhage. This is proven by the findings of 227 anemic respondents, 120 of whom experienced postpartum bleeding, a significance value of 0.001 ( $p \leq 0.05$ ) was obtained, meaning that there was a significant relationship between anemia and the incidence of postpartum bleeding. This is also in line with Sinaga's findings [18], which showed that of the 32 mothers with postpartum hemorrhage, the majority experienced anemia during their pregnancy (43.8%).

Ambarika and Yalstyrini's research [7] found that 75% of mothers experienced HPP, including 15% without anemia, 35% with mild anemia, and 25% with moderate anemia.  $p$  value = 0.045. There is a relationship between anemia and postpartum hemorrhagic. This is in line with the findings of Ariyanti et.al., [12] that pregnancies with anemia have a 11,253 times greater risk of postpartum hemorrhage than non-anemic mothers.

Pregnant women experience physiological changes during pregnancy, namely an increase in blood plasma volume, resulting in blood thinning as compensation. If these changes do not receive treatment, pregnant women can experience a decrease in immune function, bleeding complications which can threaten the safety of the mother and fetus. Pregnancy with anemia can increase the risk of complications during pregnancy and childbirth. During pregnancy, anemia can increase the risk of bleeding complications, low birth weight, low birth length, prematurity and the risk of bleeding during delivery. Anemia during pregnancy that continues until delivery can cause postpartum bleeding due to uterine atony during delivery [19].

Research by Mansukhani et.al., found that the most frequent cause of postpartum hemorrhage was uterine atony, 361 (66%) of 544 had moderate anemia and 134 (68%) of 198 had severe anemia [20]. Anemia causes red blood cells to decrease, affecting hemoglobin levels to be able to carry oxygen throughout the body. Anemia in pregnant women can affect the functioning of the uterus so that its contraction becomes inadequate. Inadequate contraction is causes bleeding to continue. Megas's [21] research also found that anemia influences the occurrence of uterine atony which progresses to postpartum bleeding.

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## 5. Conclusion

A review of 10 articles shows that there is a relationship between anemia in pregnancy and the incidence of postpartum hemorrhage. Mothers with anemia have a higher risk of postpartum hemorrhage than non-anemic mothers. It is hoped that pregnant women and midwives can regularly monitor anemia status to prevent complications in the future. Education regarding anemia also needs to be strengthened from adolescence, preconception, and conception to improve women's welfare in preparing for safe and healthy pregnancy and childbirth.

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## Compliance with ethical standards

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### *Conflict of interest statement*

The author declared no potential conflicts of interest.

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