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IS ANEMIA DURING PREGNANCY A RISK FACTOR FOR POSTPARTUM DEPRESSION? A SYSTEMATIC REVIEW

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ABSTRACT

Anemia in pregnancy is a global health problem that not only impacts the mother's physical condition, but also has the potential to affect mental health, including postpartum depression. Objective: to examine the relationship between anaemia during pregnancy and the incidence of postpartum depression through a systematic review. This study was conducted as a systematic review using the PRISMA approach and the PICO framework. Literature searches were conducted through several databases, namely Scopus, PubMed, ScienceDirect, and Wiley Online Library, with the publication period limited to the last eight years from 2018 to 2026. The search strategy utilized Boolean operators to combine relevant terms related to anemia, pregnancy, and postpartum depression. A total of 452 articles were identified through the initial database search, and after screening and applying the inclusion criteria, seven articles that met the eligibility criteria were analyzed based on study design, population, intervention, and research results. Results: Most studies found a significant association between anaemia and an increased risk of postpartum depression, with a higher risk in mothers with low hemoglobin levels as well as moderate to severe anaemia. In addition, the timing of anemia, both during pregnancy and postpartum, also affects the risk of depression. Conclusion: Anemia is a factor that is significantly related to the incidence of postpartum depression. Suggestion: early detection of anemia through routine hemoglobin checks, iron supplementation, and depression screening in maternal health services to improve overall health quality.

Keywords: anemia; antenatal period; iron deficiency anemia; maternal anemia; pregnancy; pregnant postnatal depression; postpartum depression

INTRODUCTION

Anemia is a condition that is common in all age groups and is very often experienced by pregnant women. The most common type is iron deficiency anemia related to nutritional problems, and its prevalence tends to be higher in developing countries due to limited access to food and malnutrition problems compared to developed countrie .(Tian et al., 2022). Anemia is a condition in which the concentration of hemoglobin and erythrocyte mass decreases so that it is unable to fulfill its function as an oxygen carrier to tissues in the body.(Meiriska et al., 2019). Anemia can occur at all ages, including pregnant women, and this condition is a global health problem. Anemia in pregnancy is anemia that occurs in pregnant women with a hemoglobin (Hb) concentration of < 11.0 g/L (Utomo, 2023). The most common anemia found in pregnancy is anemia due to iron deficiency caused by lack of iron intake in food, impaired absorption, increased iron needs. (Karmi et al., 2026).

Based on data from the World Health Organization (WHO), the 2025 edition of the WHO's global anemia estimate shows that 30.7% of women aged 15–49 years will suffer from anemia in 2023. This is still far from the target to achieve a reduction of 50% by 2030. The prevalence rate in 2023 reached 35.5% in pregnant women and is a critical and ongoing public health problem. (WHO, 2025) Based on report data WHO Global Anaemia Estimates in 2025, the Asian region is consistently recorded as the region with the highest incidence of anemia in pregnant women in the world, with a prevalence exceeding 50%(World Health Organization (WHO), 2025) The prevalence of anemia in pregnant women in Indonesia is still a serious public health problem, although the latest data shows a significant decrease from the previous figure. Based

on the 2023 Indonesian Health Survey (IHS), the prevalence of anemia in pregnant women has dropped to 27.7%, from the previous 48.9% in the 2018 Riskesdas (Winengsih & Ariesta, 2025)

Iron deficiency anemia (IDA) is the leading cause of anemia in pregnancy and can affect up to 50% of pregnant women in developing countries, making it a significant public health problem. This condition not only increases the risk of obstetric complications such as premature birth, low birth weight, and postpartum bleeding, but is also related to a decrease in the mother's quality of life in the postpartum period (Mishra et al., 2025). Beyond the physical impact, iron deficiency also has a major influence on neurocognitive and psychological function. Iron acts as an important cofactor in the synthesis of neurotransmitters such as serotonin and dopamine, so its deficiency can cause cognitive impairment, mood swings, increased anxiety, decreased motivation, and impaired social interaction. Therefore, iron deficiency anemia not only impacts physical health, but also increases susceptibility to various mental disorders (Barat et al., 2025).

Pregnancy is an important phase with physiological, psychological, and social changes that can increase the risk of depression until the postpartum period, which occurs in about one in five women. Stress due to body changes, the responsibility of caring for the baby, as well as insomnia and fatigue can trigger postpartum depression. (Kemppinen et al., 2022). Anemia not only has a physical impact, but it also affects cognitive, emotional, and behavioral functions such as fatigue and depressive symptoms. This condition is important to pay attention to in pregnant women because it has an impact on the mother and fetus, with a high prevalence, especially in developing countries, so it becomes a significant public health problem (Wijayanti et al., 2024).

Postpartum depression is a postpartum mood disorder that affects the mother's cognitive and emotional functioning, characterized by deep sadness, anxiety, insomnia, and weight changes. This condition generally appears 2–6 weeks after childbirth so it is important for early detection and treatment (Khotimah et al., 2025). Postpartum depression is one of the most common mental disorders that occur after childbirth. Globally, this condition is estimated to affect about 10–15% of mothers and is a significant health problem.(Anokye et al., 2018) In addition to impacting mothers, postpartum depression can also have negative effects on children's growth and development. Therefore, special attention is needed to early detection and appropriate treatment to prevent long-term impacts (Cheng et al., 2023).

Several studies have examined the relationship between anemia and postpartum depression with mixed findings. However, preventing anemia in pregnancy remains important, as it affects up to 50% of women and may increase the risk of postpartum depression and other complications, as supported by studies from Italy, Japan, Turkey, China, and South Korea showing a significant association.(Wijayanti et al., 2024). Although anemia during pregnancy is considered a potential risk factor for depression in mothers, the existing evidence is still controversial, especially in antenatal depression. Some studies have found no association between antenatal anaemia and postpartum depression (Kemppinen et al., 2022), although previous systematic reviews have reported a link between the two (Hameed et al., 2021). Therefore, the relationship between gestational anemia and depression, both during pregnancy and postpartum, cannot be definitively concluded. Based on these uncertainties, this study aims to systematically review the literature on the relationship between anemia in pregnancy and the incidence of depression in postpartum mothers.

METHOD

This study is a systematic review study compiled using the PRISMA flowchart with the PICO approach consisting of a population of pregnant women, with exposure in the form of anemia during pregnancy. The outcomes observed were the risk or incidence of postpartum depression. Literature research was conducted through several databases, namely Scopus, PubMed, ScienceDirect, and Wiley Online Library, with the publication period limited to the last eight years from 2018 to 2026 using keywords: anemia OR "maternal anemia" OR "iron deficiency anemia" AND pregnancy OR pregnant OR "antenatal period" AND "postpartum depression" OR "postnatal depression"

The inclusion criteria in this study include articles with full text that have relevant titles related to pregnant women with anemia and postpartum depression, published in English, published in the last eight years and using a cross-sectional, prospective cohort or retrospective cohort study design. The subjects of the study were adult postpartum mothers with anemia during pregnancy. The exclusion criteria include articles without full text, irrelevant titles, articles that do not use English or Indonesian, as well as articles in the form of scoping reviews, systematic reviews or literature reviews.

The instrument used in this study is the PRISMA Flow Diagram. A total of 452 articles in the initial stage met the inclusion criteria, then a further selection process was carried out using JBI instruments which included an assessment of objectives, methods, samples and settings, criteria, and research results. After going through these stages, 7 articles were obtained that were worthy of further analysis. A summary of the research results is presented in Table 1, while the analysis of the content of the article is discussed in the discussion section, and the article selection process is illustrated in Diagram 1.

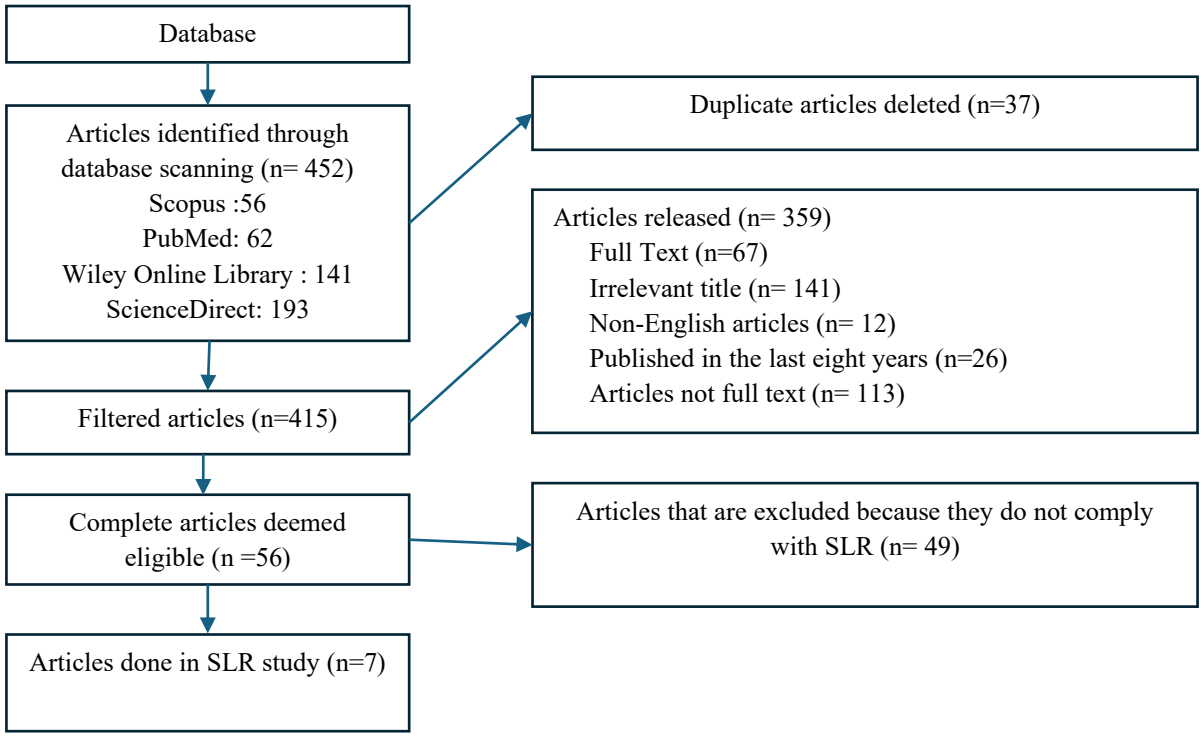

Diagram 1. PRISMA Flowchart article selection process

RESULT

Based on the results of the search and selection process, a total of 7 articles relevant to the topic and theme of the relationship between anemia and postpartum depression were obtained, which are further presented in the following table.

Table 1.
Summary of research results

Author (year)	Method	Country	Results
(Xu et al., 2018)	Study cohort	New South Wales	This population-based cohort study showed that the incidence of hospitalization due to anemia and depression increased significantly in the pre- and postpartum periods. Women with anemia have a higher risk of developing depression than those without anemia, with a chance of about 1.6 to 2 times greater, thus confirming a strong association between anemia and depression in the perinatal period. (for the primary diagnosis of depression, adjusted OR = 1.62, 95% CI = 1.25–2.11; for all diagnoses of depression, adjusted OR = 2.01, 95% CI = 1.70–2.38).
(Mohammed, 2019)	Prospective Cohort	Iraq	Studies in 281 low-risk pregnant women without early anemia showed a prevalence of postpartum depression of 5.5% based on EPDS measured 4–6 weeks after delivery. The results of the analysis showed that hemoglobin levels <11 g/dl during childbirth significantly increased the risk of postpartum depression (OR 4.64), so that the treatment of anemia as an important physiological factor can play a role in reducing the risk of depression in mothers after childbirth.
(Tian et al., 2022)	Cohort Retrospective	China	A total of 519 pregnant women over the age of 35 were involved in this study, and the results of the analysis showed that mothers with moderate to severe anemia had a significantly higher incidence of postpartum depression than mild anemia (23.2% vs. 12.5%; p=0.038). These findings confirm that

Author (year)	Method	Country	Results
			moderate and severe anemia is significantly associated with an increased incidence of postpartum depression, so early detection and treatment are needed to minimize its negative impact.
(Barat et al., 2025)	Cohort Retrospective	Iran	The study involved 155 pregnant women with measurement of hemoglobin levels at hospital admission for childbirth to assess anaemia status, as well as an evaluation of anxiety and depression using the BSI-18 questionnaire at childbirth and 4–6 weeks postpartum. The results showed that 34.8% of respondents had anemia, and this condition was significantly associated with postpartum depression. Mothers with anemia have a higher risk of developing depression than non-anaemia (OR = 3.21; 95% CI: 1.45–7.11), so anemia may be considered an important risk factor for postpartum depression.
(Cheng et al., 2023)	Cross-sectional	Malawi	The study involved 829 women in Lilongwe, Malawi, with 565 respondents analyzed, to assess the association between anaemia and postpartum depression using PHQ-9. The results showed that 37.5% of women had anemia and 2.7% had symptoms of major depression. After controlling for confounding factors, anemia was shown to be significantly associated with an increased risk of postpartum depression (OR: 3.48; 95% CI: 1.15–10.57; p=0.03), suggesting a potential association between anemia and postpartum depressive disorders.
(Kwak et al., 2022)	Prospective Cohort	South Korea	The study involved 4,067 women to assess the impact of first-trimester anemia on mental health during pregnancy and postpartum, with measurement of hemoglobin in early pregnancy and assessment of depression using EPDS. As many as 2.9% of participants had anemia, and the results showed that postpartum depression was found to be significantly higher in mothers with first-trimester anemia ($p<0.05$), suggesting a relationship between early pregnancy anemia and an increased risk of postpartum depression.
(Loussert et al., 2025)	Cohort Study	France	The study on 2,672 women showed that 43.6% experienced postpartum anemia and 13.8% experienced symptoms of postpartum depression (EPDS ≥11) at 2 months after giving birth. There was a linear relationship between hemoglobin levels and depression, with each 1 g/dL increase in hemoglobin lowering the risk of depression by 9% (aRR 0.91; 95% CI 0.82–0.997). Postpartum hemoglobin is significantly associated with a decrease in moderate depressive symptoms.

DISCUSSION

Based on the seven studies analyzed, most showed a consistent association between anemia and postpartum depression. Population-based cohort study by (Xu et al., 2018) It found that women with anemia had a 1.6–2 times higher risk of developing depression than those without anemia. These findings are reinforced by research (Mohammed, 2019) which suggests that hemoglobin levels <11 g/dL during labor significantly increase the risk of postpartum depression. This confirms that anemia in the perinatal period is an important factor that contributes to maternal mental health disorders.

In addition, the severity of anemia also plays a role in increasing the risk of postpartum depression. Research by (Tian et al., 2022) showed that mothers with moderate to severe anemia had a higher incidence of postpartum depression than mild anemia. These findings indicate that the more severe the degree of anemia, the greater the impact on the mother's psychological condition. Therefore, the treatment of anemia is not only necessary, but it is also necessary to consider its severity to prevent more serious complications.

Other studies have also shown that anemia is significantly associated with postpartum depression in a variety of population contexts. Study by (Barat et al., 2025) It found that mothers with anemia had more than three times the risk of developing postpartum depression. Similar results were also reported by (Cheng et al., 2023) in Malawi, which showed a significant association between anaemia and an increased risk of

depression after childbirth. The consistency of these findings across countries suggests that anemia is a universal risk factor for mental disorders in postpartum mothers.

In addition, the timing of anemia also affects the risk of depression. Research by(Kwak et al., 2022) It shows that anemia in the first trimester is not related to depression during pregnancy, but is significantly related to postpartum depression. Meanwhile, research by (Loussert et al., 2025) found a linear relationship between hemoglobin levels and depression, where increased hemoglobin levels are inversely proportional to the risk of depression, especially at moderate levels of depression. This shows that both anemia during pregnancy and after childbirth have an important role in influencing maternal mental health.

Overall, these seven studies show that anemia is a significant risk factor for postpartum depression, both in terms of its existence, severity, and time of occurrence. Therefore, efforts to prevent and treat anemia through monitoring hemoglobin levels and providing iron supplementation need to be an integral part of maternal health services. This approach is expected to reduce the risk of postpartum depression and improve the quality of life of mothers and their families.

CONCLUSION

Based on the results of a review of seven studies, it can be concluded that anemia during pregnancy and postpartum has a significant relationship with an increased risk of postpartum depression. The risk tends to be higher in mothers with low hemoglobin levels and in moderate to severe anemia. In addition, the timing of anemia, both in the early trimester and after childbirth, also affects the appearance of depressive disorders. Overall, anemia is an important risk factor that not only impacts the physical health, but also the mental health of the mother, so it needs attention in maternal health services.

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