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Relationship Between Pregnancy Anemia and Depression in Postpartum Mothers: Systematic Review

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ABSTRACT

Background: Anemia is one of the most significant global public health problems that affects a person's physical and mental abilities. Geography, lifestyle, and diet influence the prevalence of anemia in pregnant women, which is estimated to range from 14 to 80% in different countries (WHO, 2019. This study aims to analyze the relationship between pregnancy anemia and the incidence of depression in postpartum mothers.
Subjects and Method: Systematic Review using the PRISMA diagram in the RevMan 5.3 application. Database searches from PubMed, Scopus, Wiley Online Library, and Science Direct were conducted in 2022-2024, and can be accessed for free, with the search terms "Anemia in pregnancy" OR "Low level of hemoglobin in pregnancy" AND "depression".
Results: A total of 6 articles that were selected from 432 quantitative articles based on inclusion and exclusion criteria, showed that there was a significant relationship between gestational anemia and the incidence of depression in postpartum mothers. However, some articles have not shown a significant association between pregnancy anemia and postpartum depression.
Conclusion: Although there are studies that have not significant results, the administration of blood supplement tablets and monitoring of Fe intake in pregnant women for the prevention of anemia is important because there is a 50% chance of causing depression and other consequences during and after childbirth.

Keywords: pregnancy anemia, postpartum depression laceration, systematic review.

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BACKGROUND

Anemia is one of the most significant global public health problems that affects a person's physical and mental abilities. Geography, lifestyle, and diet influence the prevalence of anemia in pregnant women, which is estimated to range from 14 to 80% in different countries. Recently, consideration has been given to the function of iron deficiency anemia (IDA) (Sri Wahyuni et al., 2021). Women who experience IDA during pregnancy are more likely to experience delayed recovery of iron reserves in the postpartum period. The prevalence of IDA

during pregnancy is about 7.5% (Lahasa et al., 2022). Behavioral symptoms associated with anemia in adults include changes in cognition, emotions, irritability, apathy, fatigue, depressive symptoms, and hypoactivity. Although anemia during pregnancy is more common in low- or middle-income countries than in high-income countries, the prevalence of anemia in those countries is still high, especially in Asia (Su et al., 2023).

Pregnancy is an important period in which there are physiological, psychological, and social changes in a woman's life that must be adjusted. During this time, psychosocial factors and hormonal changes are at high risk of developing depression. Postpartum depression is common and is estimated to occur in one in five women after childbirth (Sucu et al., 2024). Both the physiological changes that occur during pregnancy and the postpartum responsibilities to meet the demands of infant care, in addition to conditions such as insomnia, fatigue, and lack of personal time, can lead to stress on the mother and the development of postpartum depression (Kemppinen et al., 2022). In addition, if it occurs during the postpartum period, it can negatively impact the growth and development of the child. Therefore, special attention should be paid to the early diagnosis and treatment of postpartum depression (Cheng et al., 2023).

Studies on physiological changes during pregnancy show that 8–12% of women suffer from problems such as generalized anxiety and obsessive-compulsive disorder in the postpartum period, and these problems can reach up to 19% of depression. Because emotional disorders, including depression, exert a detrimental influence on a woman's physical and psychological health, they can also lead to her inability to perform her duties as a parent and caregiver properly (Kemppinen et al., 2022).

The global prevalence of maternal antenatal and postpartum depression is estimated to be between 15% and 17%, but the percentages vary according to the definition of depression and assessment methods. This figure cannot be taken lightly to address maternal and child health problems (Bombač Tavčar et al., 2023).

Risk factors for antenatal depression are most common in the last trimester of pregnancy, and are associated with poor nutrition, smoking, and alcohol consumption during pregnancy, all of which pose risks to child development, while postpartum depression is known to disrupt the mother-newborn bond. Various mechanisms, such as iron status in the brain and its effects on neurotransmitter metabolism, postpartum bleeding, and lactation disorders, have been proposed to explain the increased risk of depression in anemia patients. Furthermore, iron supplementation given to non-anemic mothers with postpartum depression has been shown to significantly improve depressive symptoms (Bombač Tavčar et al., 2023).

Several previous studies have examined the potential link between anemia and postpartum depression and have documented mixed findings. A recent meta-analysis found that anemia during and after pregnancy significantly increases the risk of postpartum depression. In addition, in studies from Japan, Iran, and Saudi Arabia, anemia has been shown to be associated with postpartum depression (Chandrasekaran et al., 2018).

Although several recent studies and meta-analyses have recognized gestational anemia as a potential risk factor for maternal depression, the data are controversial, especially regarding the role of gestational anemia in antenatal depression. More recently, Maeda et al. found no association

between antenatal anemia and postpartum depression although previous meta-analyses reported an association between antenatal anemia and postpartum depression. A significant association between postpartum anemia and postpartum depression has been reported in several studies (Maeda et al., 2020).

Thus, data on the relationship between gestational anemia and maternal antenatal and postpartum depression are still uncertain. Therefore, this study systematically discusses a literature review related to the relationship between pregnancy anemia and the incidence of depression in postpartum mothers.

SUBJECTS AND METHOD

1. Study Design

Systematic review study using PRISMA flow diagram with PICO format. Population = Postpartum mothers.; Intervention = Giving Fe in gestational anemia; Comparison= Hb rate monitoring; Outcome= Postpartum depression. The databases used are PubMed, Scopus, Ebsco, Wiley Online Library and Science Direct. The search keywords are as follows: Anemia in pregnancy OR Low level of hemoglobin in pregnancy AND depression.

2. Stages in systematic review

1) Formulating questions in PICO format
2) Search for articles in various databases
3) Conducting critical appraisal
4) Interpreting and drawing conclusions

3. Inclusion criteria

The exclusion criteria in this study include: (1) The article used is a full paper article; (2) The article has an appropriate title and relates to pregnant women with anemia and postpartum depression; (3) Articles published in English and/ or Indonesian; (4) Articles using observational study design and retrospective cohorts; (5) Study subjects were adult postpartum mothers with anemic pregnancy; (6) Intervention in the study subjects in the form of giving fe tablets; and (7) The intervention in the comparison group was monitoring Hb levels.

4. Exclusion criteria

The exclusion criteria include non-full-text articles with irrelevant titles. Articles not in English and or Indonesian, and study protocols.

5. Variable Operational Definition

Pregnancy Anemia is a condition when the level of hemoglobin (Hb) in the blood of a pregnant woman is below the normal limit. Anemia in pregnant women can increase the risk of various problems, such as: Miscarriage, Premature delivery, Pain and death of pregnant women, Babies born with low body weight, Perinatal mortality.

Depression In Postpartum Mothers is an anxiety disorder experienced by mothers after childbirth, characterized by feelings of sadness, anxiety, and excessive fatigue. This depression usually occurs in the first 6 weeks after giving birth (Irvana, 2021).

6. Instrument

The instrument used in this study is the PRISMA Flow Digram Diagram.

RESULTS

A total of 496 articles were found in the search using various databases, such as PubMed (n= 72), Scopus (n= 63), Science Direct (n= 202), and Wiley Online Library (n= 159). Several duplicate articles were removed, and 6 articles were obtained that met the inclusion and eligibility criteria (Figure 1). Summary of 6 articles on the relationship between pregnancy anemia and depression in postpartum mothers (Table 1).

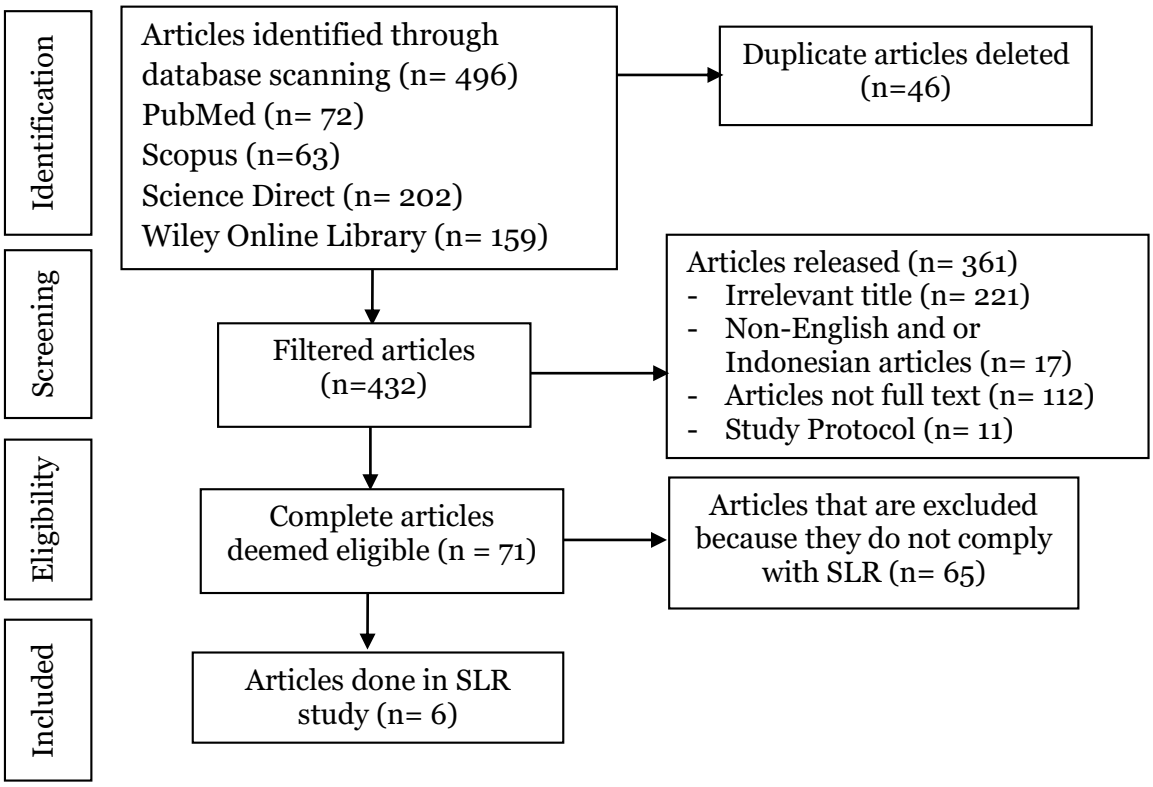

Figure 1. Diagram PRISMA flow diagram of relationship between pregnancy anemia and depression in postpartum mothers

Table 1. Summary of study of relationship between pregnancy anemia and depression in postpartum mothers

Author (Year)	Country	Method	Result
Verde et al. (2024)	Italia	Prospective observational study	Participants were categorized into 2 groups based on EPDS scores: EPDS<10 (176 patients) or EPDS≥10 (35 patients). Both groups exhibit homogeneity in terms of socio-demographic and clinical characteristics. The average hemoglobin value of pregnant women with anemia in the EPDS≤10 group (11.78±1.39 g/dl) and the EPDS>10 group (11.62±1.27 g/dl) did not differ significantly (p=0.52). There was no significant correlation between prenatal hemoglobin values and postpartum EPDS scores of <10 or ≥10.
Sucu et al. (2023)	Turky	Case-control study,	Serum ferritin levels and nutritional education during pregnancy were lower in the postpartum depression group (p<0.001). This parameter with statistical significance was identified as a risk factor in the regression analysis for postpartum depression (p<0.05). In the analysis of the operative characteristics of the recipient, >15 kg for weight gain, >28.8 for the percentage of weight gain during pregnancy, and <19 ng/dL for serum ferritin levels were identified as a cut-off value (p<0.001).

Author (Year)	Country	Method	Result
Kemppinen et al. (2022)	Turki	Cohort study	A weak association was found between gestational anemia and prenatal anxiety in early pregnancy. Furthermore, the analysis was between women with Hb<10.0 g/dL and those with Hb≥10.0 g/dL showed a link between gestational anemia and anxiety at the end of pregnancy, but otherwise found no difference in psychological distress.
Tian et al. (2022)	China	Retrospective cohort study	A total of 519 pregnant women over the age of 35 were included in the study, including 281 without anemia and 238 with anemia. No significant difference was found in the incidence of postpartum depression between the anemia and non-anemia groups (18.9% vs. 12.8%, P=0.057), while the anemia group had a significantly higher incidence of preterm labor, long labor, and caesarean section. Subgroup analysis found that older pregnant women in the moderate or severe anemia subgroup experienced postpartum depression compared to those in the mild anemia subgroup (23.2% vs. 12.5%, P=0.038). Moderate or severe anemia, the presence of depression during the first trimester of pregnancy, unplanned pregnancy, and lower parity were identified as risk factors for postpartum depression in pregnant women over 35 years of age with anemia.
Aoki et al. (2022)	Japan	Retrospective case–control study	Postpartum zinc supplementation significantly improves the status of zinc levels in the mother's blood and reduces the risk of postpartum depression (adjusted odds ratio: 0.249; 95% confidence interval: 0.062–0.988; p = 0.048). Iron supplementation is a standard and effective strategy for treating anemia; However, the combination of oral iron supplementation plus zinc produced slightly significant negative effects on postpartum hemoglobin and hematocrit compared to oral iron supplementation alone.
Kwak et al. (2022)	South Korea	multicenter prospective cohort study	Postpartum anxiety and depression were significantly more common in participants with anemia compared to those who did not (p < 0.05, both).

DISCUSSION

The first article of the study discussed the relationship between anemia and the incidence of postpartum depression. Anemia is a condition characterized by a decrease in hemoglobin values below normal values, pregnant women are said to be anemic if the hemoglobin level is less than 11 g/dl (Pai et al., 2023). Scientific researchers are debating various risk factors associated with an increased likelihood of developing postpartum depression, one of which is the incidence of gestational anemia.

Proper identification of risk factors

associated with the development of postpartum depression before childbirth can significantly support clinicians in managing this often underestimated condition, and to tailor care for women with depressive symptoms during the postpartum period, also in line with women's care preferences (Skolmowska et al., 2022). The relationship between anemia during the third trimester of pregnancy and postpartum depression is still unclear due to conflicting results in various studies (Chandrasekaran et al., 2018).

Other studies have not revealed a link between prepartum anemia and an increased likelihood of developing postpartum depressive symptoms within three days of giving birth. More deeply, this analysis determined that the EPDS subscale did not correlate with prepartum anemia.

There was a recent meta-analysis of 15 studies examining the association between anemia and maternal depression risk. The findings showed a significant association between anemia and an increased risk of maternal depression, with a chance ratio of 1.53. However, of the included studies, only seven assessed postpartum symptoms (Noshiro et al., 2022). There are studies that evaluated symptoms of depression and obtained blood samples 48 hours after giving birth, focusing only on iron storage levels and markers of inflammation. Later in a case-control and retrospective observational study, a correlation between pregnancy anemia and EPDS after 8–12 weeks postpartum in Saudi Arabia. Other researchers specifically examined the association between postpartum depression and postpartum anemia only in women who underwent elective cesarean section (Chandrasekaran et al., 2018).

The largest study to date examining the link between anemia in pregnant women and postpartum depression was conducted at a tertiary center in Japan. The study involved 1128 pregnant women and found that anemia in the postpartum period was significantly associated with an increased risk of postpartum depression (Worku et al., 2022).

Based on the study of the results of the Literature Review of the 6 articles above, it can be concluded that maternal prepartum anemia does not have a negative impact on the likelihood of the onset of postpartum depression symptoms, as measured by EPDS, in the first three days after childbirth. However, in participants with postpartum anemia, iron supplement choice had no significant effect on the risk of postpartum depression. Participants with postpartum anemia well treated with oral or intravenous iron preparations did not have a higher risk of postpartum depression than the general population at six weeks postpartum. Diagnosing and treating postpartum anemia can reduce the incidence of postpartum depression regardless of the iron preparations used. Pregnant women should always be monitored in the intake of nutrients containing iron and the consumption of blood talent as a first step in preventing anemia. Judging from the review literature, this review literature shows that there are a lot of effects of anemia on pregnant women that will be experienced during childbirth and after childbirth.

AUTHOR CONTRIBUTION

In this case, the researcher contributes to collecting, evaluating and synthesizing literature relevant to the topic of discussion from various sources. Judging from the literature of this review, there are a lot of impacts of anemia on pregnant women that will be experienced during childbirth and postpartum

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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