Anemia in Pregnancy: Implications for Maternal and Perinatal Outcomes

Abstract :

This literature review will summarize recent evidence on implications of maternal anemia in pregnancy, with a focus on maternal mortality and morbidity.Infections like malaria, HIV and hookworm contribute in endemic regions. Thalassemias and hemoglobinopathies are prevalent genetic hemoglobin disorders in certain ethnic populations. Higher transfusion rates align with clinical management guidelines. However, for other morbidities like postpartum hemorrhage, sepsis and preeclampsia, associations are less consistent.Further research should confirm whether treating non-anemic pregnant women poses any cardiovascular risks and also determine if supplemental iron beyond routine needs is advisable. Ensuring adequacy of intake continues as the priority for protecting maternal and infant health.

Keywords : maternal anemia, pregnancy, hemoglobin concentration, nutritional deficiencies

Introduction

Anemia, defined as low hemoglobin concentration, is a significant public health problem affecting nearly half of all pregnant women globally (1). The prevalence is highest in low- and middle-income countries (LMICs), with rates over 40% in many regions (2). Iron deficiency accounts for most cases, while other causes include nutritional deficiencies, infections, and hematologic disorders (3).

Anemia in pregnancy can adversely impact both maternal and perinatal health. However, associations may depend on the severity of anemia, timing during gestation, and effectiveness of treatment interventions currently in place. This literature review will summarize recent evidence on implications of maternal anemia in pregnancy, with a focus on maternal mortality and morbidity.

Global Burden and Etiologies

According to the latest estimates, 29% of non-pregnant women globally have anemia, increasing to 40% during pregnancy (1). Regional prevalence in pregnant women ranges from 17% in high-income regions to 48% in LMICs in Southeast Asia and 65% in sub-Saharan Africa (1). Approximately half of cases are thought to be attributable to iron deficiency (5).

Iron requirements increase significantly during pregnancy to support fetal development. Without sufficient intake or stores, pregnant women can quickly become deficient, developing iron-deficiency anemia. Additional nutrient deficiencies exacerbating anemia risk include vitamins A, B12 and folate. Infections like malaria, HIV and hookworm contribute in endemic regions. Thalassemias and hemoglobinopathies are prevalent genetic hemoglobin disorders in certain ethnic populations (3).

Associations Between Anemia Severity and Maternal Morbidity/Mortality

The severity of anemia appears important in determining maternal risks. Rahman et al. reported a 60% increase in the pooled odds of maternal mortality with any anemia, rising to 2.36-fold for severe cases (hemoglobin <7 g/dL) specifically (6). A 2018 multi-country study found maternal mortality nearly doubled for women with hemoglobin <6 g/dL compared to 6.0-11.9 g/dL after adjustment for confounders (9).

In regards to morbidities, a meta-analysis found that compared to no anemia, mild and moderate cases increased the odds of blood transfusion 1.26 to 2-fold, while severe anemia escalated risk over 8-fold (7). Higher transfusion rates align with clinical management guidelines. However, for other morbidities like postpartum hemorrhage, sepsis and preeclampsia, associations are less consistent. A 2015 review showed no clear link between anemia and preeclampsia, while other cohort data does suggest a potential U-shaped relationship similar to the recent India trial (10, 11).

Recent Findings on Anemia and Maternal Outcomes in Rural India

Bone et al. conducted an important new study assessing associations between early pregnancy anemia and maternal morbidity in over 11,000 women participating in a trial across Karnataka State, India (11). Despite very high rates (>85%) of anemia, nearly all women received iron supplementation by delivery, reflecting India's public health policy for routine antenatal administration.

Overall 5% of women experienced a major morbidity, most often (in order): blood transfusion, antepartum hemorrhage, sepsis. Aligning with guidelines for managing anemia, transfusion rates showed a dose-response increase with severity of deficiency. For other outcomes, there were no differences by anemia status except postpartum hemorrhage, which was significantly higher for severe cases.

Uniquely, the study also assessed impacts on hypertensive disorders of pregnancy. Using blood pressure measurements standardized for preeclampsia research, a U-shaped relationship emerged. Compared to no anemia, mild and moderate deficiency associated with 24-29% lower pregnancy hypertension and preeclampsia risks, despite similar gestational ages. Women with hemoglobin ≥11g/dL appeared most vulnerable. Posited explanations include elevated blood viscosity or oxidative stress among non-anemic women. However, further interrogation in cohorts encompassing the full hemoglobin range is warranted to confirm this pattern.

Conclusion

Anemia in early pregnancy remains highly prevalent globally, especially in LMICs like India. Iron deficiency drives most cases, but increasing prevalence of overweight/obesity may signal a double burden of malnutrition. While evidence supports increased risks of certain morbidities with worsening deficiency, associations with sepsis, hemorrhage and preeclampsia are less consistent. Recent findings of lowered hypertension/preeclampsia odds among mildly anemic women challenge conventional thinking on dose-response harms. Further research should confirm whether treating non-anemic pregnant women poses any cardiovascular risks and also determine if supplemental iron beyond routine needs is advisable. Ensuring adequacy of intake continues as the priority for protecting maternal and infant health.

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