***Review Article***

# Iron Deficiency Anemia Among Women Of Reproductive Age

ABSTRACT

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**Background:** Iron deficiency anemia is a significant global public health concern that can lead to a decline in mental and physical performance and mortality among women of reproductive age.

**Objective:** The goal of this literature review is to review and integrate information from the literature on the prevalence, etiology, consequences, and treatment options associated with iron deficiency anemia.

**Review:** Prevalence of iron deficiency anemia is high among women of reproductive age especially in low-income countries such as African and Asian countries compared to high-income countries. This could be due to differences in topographical, dietary, and cultural factors. Additionally, iron deficiency can be caused by poor absorption of iron or decreased iron intake. Poor absorption can occur as a side effect of different medications, while decreased iron intake could be the result of a diet high in legumes but low in protein and fruits. Moreover, iron deficiency anemia can be caused by persistent diseases, infections, increased demand during pregnancy, and obesity. If left untreated, the consequences of iron deficiency anemia include low quality of life, poor mental and physical health, a decline in work performance, and increased comorbidities. The current mainstay of treatment for iron deficiency anemia includes oral iron administration, parenteral iron administration, and blood transfusion.

**Conclusion:** Iron deficiency anemia is one of the most common health care issues among women of reproductive age. Different factors like blood loss, distant health care facilities, and poor diet can all influence the iron status in women of reproductive age. If left untreated, anemia can cause a variety of negative consequences, which can be avoided by implementing timely, cost-effective therapies.

***Keywords:*** *Iron deficiency anemia, Iron deficiency, Women of reproductive age, Reproductive age, Women,*

## 1. INTRODUCTION

Iron deficiency anemia (IDA) is the most prevalent dietary deficit on a global scale; it affects people of all ages in both developed and poor countries (1). According to recent reports, approximately 29 percent of the world's population has anemia, with around 50 percent of cases being caused by iron deficiency (2). Iron deficiency anemia is a chronic condition defined by a low hemoglobin (HB) level. IDA is more prevalent in women of reproductive age; it affects approximately one-third of women globally. Studies have reported an increased prevalence of iron deficiency anemia among women of childbearing/reproductive age at a rate of roughly 30%-40% especially in poor countries (3).

The term women of reproductive age is defined as the females who are between menarche and menopause, usually between the ages of 12 and 49. WRA are at an elevated risk of iron insufficiency due to menstrual blood loss and inadequate dietary intake of iron to compensate for monthly losses. When an iron shortage is severe, it can impair the erythropoiesis process, resulting in a drop in hemoglobin concentration causing iron deficiency anemia. The consequences of IDA among WRA, children, and pregnant are worst in low-income countries. IDA has been shown to impair the physical performance, physical activity, and cognitive performance, as well as to promote depression and fatigue (4). That is because women of reproductive age, children, and pregnant are the most anemic population with the least access to services and interventions.

Furthermore, according to world bank research on anemia, the prevalence of anemia among WRA decreases with income in every country. In many countries, prevalence is twice as high among the poorest compared to the richest countries (5). ln different developing countries, numerous causes, and outcomes of iron deficiency anemia among women of reproductive age have been recorded in the literature, and these are not summarized in one place. Additionally, although iron-deficiency anemia is a highly prevalent condition usually connected with gynecology and obstetrics it is most frequently overlooked in normal practice.

Therefore, the purpose of this literature review was to evaluate and integrate the available data on the prevalence, potential causes, outcomes, and up-to-date use of interventions associated with iron deficiency anemia among women of reproductive age.

## 2. LITERATURE REVIEW

### 2.1 PREVALENCE OF IRON DEFICIENCY ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

Iron deficiency is the most globally widespread dietary condition reaching an epidemic level in many developing countries. Additionally, it is the most frequent nutritional insufficiency found in the developing world; according to the reports in 2011, the global anemia prevalence was 38 percent in pregnant women and 29 percent in non-pregnant women. While anemia affects all countries, it is more prevalent in low-middle-income countries, particularly Sub-Saharan African and Asian countries, which collectively account for 89 percent of the total burden of anemia. Additionally, studies conducted in Eastern Africa reported an increase in the prevalence of anemia among WRA, ranging from 19.2% in Rwanda to 49.2% in Zambia (6).

Another study showed that the anemia prevalence among WRA in eastern Africa was 34.85 (95 percent confidence interval), which is similar to study findings conducted in Nepal and India. The prevalence rate of anemia was found to be a bit decreased in previous studies conducted in Brazil Timor-Leste, Iran, Turkey, and Thailand compared to the research conducted in Myanmar and Nepal, India, Vietnam, and the Democratic Republic of Congo where the prevalence of IDA was found to be higher (7). Furthermore, Petry et al. (2016) conducted a systemic review to estimate the prevalence of iron deficiency anemia in WRA in low- and high-income countries. Low-income countries, for example, Bangladesh, Mongolia, Cameroon, Côte d'Ivoire, and Iraq all reported a prevalence of 18.5–28.6 percent compared to high-income countries (8).

This disparity in the prevalence of anemia between countries could be explained by topographical, dietary, and cultural factors that vary between countries. Moreover, an increase in the prevalence of anemia among WRA in eastern African and Asian countries may be explained by their biological and social predisposition to anemia. Additionally, in underdeveloped countries, particularly in India and Eastern Africa, access to iron-rich food is insufficient due to their low socioeconomic position, limited access to and utilization of health services, beliefs, and illiteracy which may contribute to

the development of anemia. Also, this regional difference in anemia may be related to the distribution and frequency of infectious diseases prevalent in developing countries such as eastern Africa and India, and Pakistan.

By understanding the prevalence of anemia among WRA, the burden of anemia among a specific population can be estimated. Additionally, there could be different reasons for the development of IDA among WRA in various countries. For example, the prevalence will tell that poor socioeconomic status may be a factor in the high prevalence of anemia among women of reproductive age in poor countries. So, if we acknowledge the prevalence of anemia in a certain country, efforts could be made to prevent IDA in that specific country. Moreover, knowledge of a population's disease burden, whether local or global, is critical for getting the resources needed to fund specific services or health-promotion activities in a certain region. Furthermore, health system planners and public health specialists can benefit greatly from prevalence data.

## 2.2 MULTICAUSAL ETIOLOGY OF ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

IDA is linked to poor outcomes, delayed offspring development, and a decline in performance and productivity. Understanding the potential mechanisms and factors that contribute to iron deficiency anemia in WRA is the very first step toward developing effective strategies for addressing this public health issue in disadvantaged women. Multiple causes and factors lead to the development of IDA among WRA. The causes of iron deficiency can be divided into two types. One is a rise in requirements for iron, whereas the other is a decrease in iron absorption and intake.

Increased iron requirements could be related to the body's growing needs, blood loss, worms, pregnancy, infections, inflammatory bowel disease, or blood donations. Women with gynecological disorders or who lose a lot of blood during their menstrual periods are also at a higher risk of developing IDA. Additionally, anemia is associated with and might be exacerbated by genetic disorders such as thalassemia sickle cell disease, and thalassemia. Moreover, anemia can also be caused by a variety of factors, including chronic renal failure, tuberculosis, bone marrow illnesses that limit red cell synthesis, and rheumatoid arthritis (9).

Furthermore, there is an increased demand for roughly “700-850 mg” of body iron throughout pregnancy, and lactation leads to extra iron loss through breast milk. However, lactation amenorrhea compensates for this loss (10). But as soon as the levels of iron in the body decrease by repeated pregnancies, the condition becomes worse. The severity of anemia in preschool children has been linked to birth order, implying a steady depletion of mothers' iron stores following many pregnancies.

Additionally, iron deficiency is caused by a shortage of dietary iron or low iron bioavailability due to a high quantity of inhibitors in the diet. Diets that are high in legumes and cereals and poor in fruit and meat are more likely to have low bioavailability. Also, raised hepcidin limits the availability of iron to pathogens, as well as host cells and tissues, for biological processes. While this is beneficial for acute infections, persistent illnesses can result in severe and long-term iron deficiencies. Continuous and persistent iron losses cannot be compensated for by increasing iron absorption. That is because iron absorption can be hampered by poor iron bioavailability in diets and the effects of medications. For example, reduced iron absorption could be caused by the side effects of certain drugs, which make it difficult to absorb iron from food. Moreover, factors that cause elevated hepcidin levels, such as obesity, also affect absorption and impede iron export and reduce the amount of iron available for erythropoiesis (11).

Another explanation is a lower intake of iron-rich foods. In developed countries, the average daily intake of dietary iron is between 10 and 15 mg; however, only about 5% to 10% of this amount is absorbed, resulting in 1–3 mg per day (12). It has to do with increasing iron consumption. For example, anemia is more common in large families and families with illiterate moms. Illiterate family members distributing food unequally can expose WRA to anemia because they may lack access to iron-rich foods. Cultural beliefs also affect the intake of iron. Some cultural groups shun iron-rich foods in their diet, and a significant proportion of the global population believes these cultural groups (13).

Another cause of iron deficiency is obesity. Obesity, a chronic inflammatory condition, is on the rise, and it has the ability to wreak havoc on iron levels. According to the studies, obesity raises the risk of iron deficiency anemia, due to adiposity-related lower food absorption, low-grade inflammation and changes to the iron regulatory protein hepcidin and obese people are more likely to be iron deficient (14). Although dmt-1 (divalent metal transporter 1) can be upregulated to boost dietary iron absorption, the amount of compensation that can be achieved is limited.

Additionally, according to various researches conducted throughout the world, age, wealth status, occupation, marital status, media exposure, education level, body mass index, parity, ever had of terminated pregnancy, modern contraceptive use, household size, community literacy level, and residence all are associated with iron deficiency anemia (15, 16).

Moreover, research proposed that distance from a health facility was found to be a significant factor related to anemia in women who consider distancing a big issue. This could be because women who live far from a facility can't get health services on time, such as iron and folate supplements during their reproductive age and even during pregnancy, and other services connected to the continuum of care, all of which make them at more risk of developing anemia. This has been especially true in poor countries like India(17).

## 2.3 HEALTH CONSEQUENCES OF THE IRON DEFICIENCY ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

Iron is required for a variety of physiological functions, the health consequences of iron deficiency anemia in WRA are numerous and possibly fatal if left untreated. The common sign and symptoms of iron deficiency anemia include lethargy, difficulty controlling body temperature, impaired immunological function, restlessness, depression, emotional instability, dizziness, palpitations, and inflamed tongue. IDA can also cause some severe adverse effects including tachycardia, edema, and heart failure leading to the death of the patient. Additionally, iron deficiency anemia has a wide-ranging impact on people's lives, with victims reporting negative consequences on their quality of life and work performance. According to a survey, women who reported having 'low iron' suffered from poor mental and physical health compared to women who had no previous history of iron deficiency (18). Research reported anemia is also linked to an increased risk of stress fractures (19).

#### 2.3.1 CONSEQUENCES OF IRON DEFICIENCY ANEMIA ASSOCIATED WITH HEAVY MENSURAL BLEEDING AMONG WOMEN OF REPRODUCTIVE AGE

Iron deficiency anemia associated with heavy mensural bleeding (HMB) has a significant impact on women's well-being and health, it increases morbidity and negatively impacts the quality of life of women. A Swedish cross-sectional study, conducted on 1547 women reported significantly worst health-associated quality of life, limitations of professional and social activities and higher negative perceptions than women with normal menstrual blood loss(20). Additionally, severe IDA caused by HMB has been linked to the need for blood transfusions and hospitalizations in adolescent girls(21). Mounting evidence also indicate the harmful effects of HMB on sufferers' emotional, social and physical quality of life.

#### 2.3.2 CONSEQUENCES OF IRON DEFICIENCY ANEMIA AMONG PREGNANT WOMEN

Iron deficiency anemia is common among pregnant women. IDA can cause major maternal difficulties during pregnancy, including increased impact and even risk of obstetric hemorrhage, increased susceptibility to infections, and the need for “peripartum blood transfusions” (22). Anemia has also been discovered as a substantial risk factor for “postpartum hemorrhage” which is well-defined as blood loss from the vaginal canal of 500 mL or more within the first 24 hours after childbirth. According to new research, women who are anemic had a nearly seven-fold increased risk of death from a postpartum hemorrhage at the start of pregnancy (23).

### 2.4 MANAGEMENT GUIDELINES FOR THE TREATMENT OF IRON DEFICIENCY ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

The current mainstay of treatment for iron deficiency anemia is iron replacement therapy, however, diagnosing and treating the source of iron shortage is critical for optimal management. Additionally, preventative therapy for iron deficiency anemia may be beneficial in particular female populations. WHO advises that adolescent girls, menstrual adult women, and pregnant women living in areas with a high prevalence of anemia (40 percent) should take iron supplements every day (24). Although the dangers and advantages of prophylactic iron therapy have been questioned, recent research clearly supports preventive supplementation of iron during pregnancy in countries where iron deficiency anemia screening is insufficient (25).

#### 2.4.1 ORAL ADMINISTRATION

Individuals with IDA, for example, pregnant women, are recommended to consume “100–200 mg elemental iron” daily in 2 to 3 separate doses, while those with iron deficiency are advised to consume 100 mg daily. Research suggests that iron supplements containing iron in the ferrous state are more readily absorbed (26). An individual can take iron pills at least one hour before eating or at night to maximize absorption. Additionally, items that restrict absorption, such as milk and tannins should not be taken. Adverse effects of oral iron therapy include black feces, nausea, abdominal discomfort, constipation, and vomiting due to mucosal luminal damage caused by free radicals. Although some ferric compounds have been studied, they have less bioavailability and are often less soluble. Currently, a novel oral preparation is being used in the United States that is not available on prescription but is commercially accessible. It is an “iron polymaltose complex” composed of maltol (a food additive) that is soluble at neutral ph and ferric iron. Each pill contains 100 mg of ferric iron. It has fewer adverse effects on the gastrointestinal tract and is as effective as earlier ferrous supplements (27).

#### 2.4.2 PARENTERAL ADMINISTRATION

Patients with absorption problems of iron oral preparations, such as those who underwent the small intestinal procedure, bariatric surgery, and gastrectomy may benefit from parenteral therapy. Other indications for iron transfusion include gastrointestinal side effects, worsening of symptoms of inflammatory bowel disease, and renal failure caused by anemia treated with erythropoietin.

Although parenteral administration is an emergency strategy for the treatment of iron deficiency anemia, it has some side effects. According to the research, between 1976 and 1996, up to 0.7 percent of individuals receiving iron dextran experienced serious side effects, with 31 fatalities documented (28). That is why other formulations and methods of iron supplementation are being used. Research showed that compared to iron dextran, sodium ferric gluconate (ferrlecit), and iron sucrose have higher bioavailability and a lower risk of life-threatening anaphylaxis. A study reported that

approximately 35% of patients who receive iron sucrose experienced minor side effects (for example diarrhea, nausea, and headache). One small trial found that intravenous iron dextran and sodium ferric gluconate had similar adverse effect profiles, with only one major adverse reaction observed in the iron dextran group (29). Because the complete dose can be given in one sitting, if this finding is replicated in bigger investigations, it could justify the use of iron dextran over sodium ferric gluconate.

### 2.4.3 BLOOD TRANSFUSION

Blood transfusion is the last resort for the treatment of IDA. Given the risks of transfusion, such as anaphylaxis, fluid overload, allergic reactions, infection, acute lung injury, and potential sensitization of red cell antigens in women of childbearing age, it should only be used to treat major obstetric hemorrhage or those who have organ dysfunction or are hemodynamically unstable. Each unit of “packed red blood cells” transfused should increase hemoglobin by 10 g/l. Once the patient has been stabilized, the requirement for the next iron supplementation can be decided (30).

## 2.5 GOVERNMENT POLICIES TO PREVENT IRON DEFICIENCY ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

Currently, the government has made anemia policies that enhance the recognition, measurement, and knowledge of anemia among WRA and scale-up preventative and treatment efforts. These policies create a favorable environment for the application of comprehensive food programs for nutrition and “nutrition-sensitive measures” that promote the control and as well as prevention of anemia in women of reproductive age. They also work on partnerships between government and nonactors for the financial commitment. Additionally, the government should ensure that development policies and strategies outside of the health sector cover nutrition as well as other main causes of anemia related to the country's setting, particularly the education sectors and agriculture. Moreover, social marketing and community mobilization can be used to enhance awareness of the importance of iron supplementation among women of reproductive age and other supply chain actors. For instance, health networks and local women's organizations can increase the uptake of iron by encouraging women to purchase and use it (31). Government can also give free iron supplements to poor women to reduce the risk of anemia. Furthermore, the government policies should Include necessary interventions with an impact on anemia in development programs, agriculture, national health, education targeting nutritional and non-nutritional causes of anemia, and nutrition strategies.

## 3. CONCLUSION

Iron deficiency anemia is a significant public health problem in developing countries, particularly among women of reproductive age. Numerous factors such as obesity, distant health care services, mensural loss, socioeconomic situation, diseases, and diet might influence the iron status of women of reproductive age. Additionally, anemia can result in a variety of negative consequences such as maternal death, and poor physical and mental health which can be avoided by initiating appropriate cost-effective therapies on time. Currently, oral administration, iron infusion, and blood transfusion are the current mainstay of the treatment. However, all these treatment options have some minor and as well as serious side effects, therefore future studies need to be conducted to find out the best and safe treatment option for women of reproductive age.

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