

# The Effect of Iron Giving on Hemoglobin Levels in Anemia Pregnant Women

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## The Effect of Iron Giving on Hemoglobin Levels in Anemia Pregnant Women

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### Abstract

*Anemia that occurs during pregnancy has become a global health problem. The amount of iron needed by pregnant women is much greater than that of non-pregnant women so pregnant women have a high risk of developing iron deficiency anemia. The method used in this study is a literature review study. The databases used in the source search are google scholar and Pubmed. The search for articles was carried out by collecting themes about the effect of iron administration on hemoglobin levels in anemic pregnant women. Pregnant women with anemia who consume iron show an increase in hemoglobin levels. Giving iron given for 90 days by consuming it once a day can increase hemoglobin levels by 1 g/dl.*

**Keywords:** *Iron, Hemoglobin levels, Anemia in pregnancy*

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## Introduction

Anemia that occurs during pregnancy has become one of the global health problems with the highest prevalence of anemia in 2021, 56%<sup>18</sup> found among pregnant women in low and middle-income countries, and the lowest at 24.1% reported among pregnant women in South America. Among the World Health Organization (WHO) regions in 2021, Africa has the highest prevalence of anemia in pregnancy (57%), followed by Southeast Asia (48%) including Indonesia (WHO, 2021).

Based on the results of Riskesdas 2018, it is stated that in Indonesia 48.9% of pregnant women experience anemia. As many as 84.6% of anemia in pregnant women occurs in the 15-24 year age group (Kemenkes RI, 2019). Malnutrition predisposes to iron deficiency anemia in pregnant women in Indonesia. The amount of iron needed by pregnant women is much greater than that of non-pregnant women. Pregnant women experience a rapid decrease in hemoglobin and hematocrit because at this time there is a rapid expansion of blood volume.<sup>14</sup> Iron deficiency is not the only cause of anemia, but as the prevalence of anemia increases, iron

deficiency is the main cause. Pregnant women have a high risk for iron deficiency anemia (Hidayanti & Rahfiludin, 2020).

Iron is needed in the process of hematopoiesis (blood formation), namely the synthesis of hemoglobin (Hb). According to Purnamasari (2020) iron is an important micro mineral in the formation of hemoglobin which functions in the transport, storage, and utilization of oxygen. Therefore, iron<sup>4</sup> deficiency generally causes paleness, weakness, fatigue, dizziness, lack of appetite, decreased body fitness, decreased work ability, decreased immunity, and impaired wound healing. The results showed that gestational age and hemoglobin levels in third-trimester pregnant women were associated with the incidence of LBW (Fanni & Adriani, 2017). In addition to increasing the risk of LBW, anemia can increase the risk of stillbirth and neonatal death (Patel et al., 2018).

Blood-added tablets (TTD) or iron (Fe) tablets are nutritional supplements containing<sup>15</sup> 60 mg of elemental iron and 0.25 mg of folic acid which can prevent and treat iron nutritional anemia. From the results of the

study, giving iron and folic acid supplementation earlier during pregnancy can prevent iron and folate deficiency more than increasing the dose of supplements in the next stage of pregnancy. Giving this supplement is recommended for pregnant women with a dose of one tablet every day during pregnancy. This recommendation can increase the hemoglobin level of pregnant women (Wildayani et al., 2018).

The purpose of this study was to determine the effect of giving iron tablets on hemoglobin levels in pregnant women with iron deficiency anemia.

### Method

The method used in this study is a literature review study that aims to explore the effect of iron administration on hemoglobin levels in pregnant women with anemia. The review process begins with identifying journal articles that are relevant to the research topic. The databases used in the source search are google scholar and Pubmed. The topic of this study was the effect of iron

administration on hemoglobin levels in anemic pregnant women. The inclusion criteria for searching for literature sources are the year of publication of the article used starting from 2017 to 2022, in Indonesian and English, and the full article. The search keywords were iron, hemoglobin levels, and anemia in pregnancy.

### Result and Discussion

A literature search through an electronic database yielded 54 articles that could potentially be reviewed. After identifying abstracts from 30 articles, 24 articles were selected. Further identification is carried out in more detail to determine which articles are relevant and meet the inclusion criteria in this literature review. From this identification, 5 articles were obtained which will be reviewed in this study.

The five articles selected for review in this study are research that has a relationship with the research topic. A summary of the articles reviewed in the study can be seen in table 1. below:

Table 1. Summary of articles

| Writer  | Country   | Research Title  | Research methods | Results   |
|---|-----------|---|------------------|---|
| Sari, YO, Darmayanti, D., & Ulfah, M. (2021). | Indonesia | The Effect of Iron and Spinach on Increasing Hemoglobin Levels of Pregnant Women with Anemia in the Working | Quasi-experiment | The results of the analysis showed an increase in hemoglobin levels after iron was given to pregnant women with anemia. . Before being given iron, the mean value was 9.6 g/dl, |

|                              |           |   |                               |  |
|------------------------------|-----------|---|-------------------------------|--|
|                              |           | Area of Martapura I Health Center   |                               | 1 and the hemoglobin level after being given iron was 10.8 g/dl. During administration, the average change in hemoglobin in pregnant women in the intervention group was 1.43 g/dl. control group 1.17 g/dl.   |
| Ratih, RH (2017)             | Indonesia | The Effect of Iron (Fe) Administration on the Increase in Hemoglobin of Pregnant Women with Anemia at RSIA Zainab in 2015                             | Quasi-experiment              | The results of the study obtained a p-value of 0.001. There is an effect of giving iron (Fe) tablets to increase hemoglobin levels in anemic pregnant women with a p.value<0.05  |
| Moh. Irham & Susandi. (2019) | Indonesia | Effect of Serum Iron Injection Therapy on Increasing Hemoglobin Value of Pregnant Women with Anemia   | Pre experiment                | 1 The results showed that the average hemoglobin level of anemic pregnant women before administration of serum iron 9.75 g/dl, after administration of serum 11.20 g/dl which means that there is an effect of giving serum iron therapy to increase hemoglobin levels in pregnant women with anemia |
| Riswanda, J. (2017).         | Indonesia | The relationship between iron intake and its inhibitors as predictors of hemoglobin levels of pregnant women in Muara Enim Regency.                   | Observation                   | Research results obtained Pregnant women with high iron intake have higher hemoglobin concentrations. In contrast, pregnant women with a high intake of tannins and calcium have lower hemoglobin concentrations.  |
| Ahamed, F., et al (2018).    | India     | Effect of Directly Observed Oral Iron Supplementation During Pregnancy on Iron Status in a Rural Population in Haryana: A Randomized Controlled Trial | A Randomized Controlled Trial | 16 The results of a study conducted under the supervision of anemic pregnant women who consumed iron tablets for 100 days showed an increase in hemoglobin levels.   |

Anemia in pregnancy is the condition of the mother with HB levels below 11 g/dl in the first and third trimesters or HB levels < 10.5 g/dl in the second trimester. To prevent anemia, every pregnant woman is expected to get a blood-added tablet (TTD) of at least 90 tablets during pregnancy. Iron tablets are mineral tablets needed by the body to form red blood cells or hemoglobin. The element iron is the most important element for the formation of red blood cells (Kemenkes RI, 2020).

According to Sari's research (2021) explained that there was an increase in hemoglobin levels in anemic mothers before and after being given iron, before being given iron, the average value was 9.69 g/dl, and hemoglobin levels after iron were given an average value of 10.86 g/dl. This result is in line with the research of Ratih R (2017). The results showed that the average hemoglobin level in pregnant women with anemia before administration of iron (Fe) tablets was 8.81 g/dl and the hemoglobin level after administration of iron (Fe) tablets was 12.58 g/dl. These results indicate that there is an increase in hemoglobin levels in pregnant women with anemia after

consuming iron (Fe) tablets of 3.72 g/dl. Age does not affect the low level of hemoglobin in anemic pregnant women. Low hemoglobin levels in pregnant women are influenced by the lack of consuming foods that contain iron and an unhealthy lifestyle.

The effect of iron supplements on pregnant women is not only to meet the needs of the mother but also can help maximize brain growth and baby weight. Fetal weight gain showed lower results in the group of pregnant women. Iron supplementation in pregnant women can reduce by 73% the incidence of anemia in term pregnancy and 67% incidence of deficiency anemia in term pregnancy. This can be explained that iron supplements can increase, among others, reticulocytes, red blood cells, and hemoglobin (Rini hariani, 2017).

Iron is a mineral needed by the body which functions for the formation of hemoglobin. Every 1 mg of iron intake can increase 0.052 Hb concentration (Riswanda, 2017). Based on Moh Irham's research (2019) conducted on a sample of 48 respondents, it was found that the average hemoglobin level in pregnant women who

experienced anemia before administration of serum iron injection therapy was 9.75 g/dl and hemoglobin levels after administration of serum iron injection therapy, is 11.2 g/dl. These results indicate that <sup>8</sup> there is an increase in hemoglobin levels in pregnant women after being given serum iron injection therapy of 1,454 g/dl (Irham & Susaldi, 2019).

One alternative to meet iron needs besides consuming blood-added tablets (TTD) <sup>1</sup> can be done by consuming green vegetables in the diet, one of which is spinach. <sup>1</sup> Spinach that has been cooked contains iron as much as 8.3 mg/100 grams. Adding iron to spinach plays a role in the formation of hemoglobin (Rohmatika & Umarianti, 2018). This is in line with Sari Y's research (2021) which found hemoglobin levels before and after being given iron and spinach in the intervention group with an average value before being given 9.55 g/dl and an average value after being given 10.96 g/dl.

Based on Ahamed F's (2018) research conducted for 100 days to observe iron consumption for pregnant women with anemia, there was an increase in hemoglobin levels of 0.56 g/dl. However, the intervention

group still experienced anemia, this could be caused by many factors. Factors inhibiting iron absorption include tannins, phytates, oxalates, and calcium which will bind iron before it is absorbed by the intestinal mucosa into insoluble substances, thereby reducing its absorption. Every 1 mg of calcium and every 1 gram of tannins can inhibit the absorption of iron concentrations of <sup>2</sup> 0.00687 gr/dl and 0.123 gr/dl (Ahamed et al., 2018). With reduced absorption of iron, due to these inhibitory factors, the amount of ferritin will also decrease which has an impact on decreasing the amount of iron that will be used for hemoglobin synthesis and replacing damaged hemoglobin. This is one of the factors that cause low levels of hemoglobin in the blood (Riswanda, 2017).

So, we can know that iron tablets can increase hemoglobin levels in the blood as long as they are consumed properly, whereas iron tablets given for 90 days by taken 1x a day can increase hemoglobin levels by 1 g/dl.

## Conclusion

Pregnant women are at high risk of anemia during pregnancy which can threaten maternal and neonatal conditions. Pregnant women experience a rapid decrease in

hemoglobin and hematocrit because at this time there is a rapid expansion of blood volume. Iron is needed in the process of blood formation, iron administration can increase hemoglobin levels of pregnant women when consumed properly for 90 days by consuming 1x a day can increase hemoglobin levels by 1 g/dl.

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