



Prophylactic Oral Iron Therapy During Pregnancy

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Abstract

Background: Anemia is one of the most common medical disorder during pregnancy and one of the important cause of maternal death in the third world countries. A sufficient supply of iron is also required for the proper development of the fetus and newborn baby. During pregnancy, iron deficiency and iron deficiency anemia (IDA) increase the risk of preterm birth and low birth weight. Iron is essential for the development of the fetal brain and the newborn's cognitive abilities. Pregnant women receive oral iron prophylaxis have better iron status and are less likely to develop IDA. The aim of the study was to evaluate the effects of prophylactic oral iron therapy in pregnant women in terms of rise of haemoglobin level. **Material & Methods:** The present study was conducted at the department of obstetrics and gynecology, US-Bangla Medical College & Hospital, Dhaka, Bangladesh, from January 2020 to June 2021 with a sample size of 100 pregnant women. All the participants were non-anemic at the time of inclusion, and a proper follow-up was done. All the women were supplied with 60 mg dose of elemental iron prophylactic. During follow up haemoglobin level was measured and serum ferritin level was measured when anemia was found. The collected data were analyzed by using the Statistical Package for Social Science (SPSS-24) for windows version 10.0. **Results:** During the first follow-up, 89% were found non-anemic, 9% were mildly anemic and 2% were moderately anemic. S ferritin levels of the 11 anemic participants showed that 36.30% had <15 ng/mL ferritin levels, and 63.64% had 15-150 ng/mL ferritin levels. During the second follow-up, 86% were non-anemic, 1% was severely anemic, 4% were moderately anemic and 9% were mildly anemic. S. ferritin level test showed that among the 14 anemic women, 35.72% had <15 ng/mL, 57.14% had 15-150 ng/mL, and 7.14% had >150 ng/mL serum ferritin levels. During third follow up at 34-36 weeks, 81% were non-anemic, 1% were moderately anemic, 8% had mild anemia. S. ferritin levels of 9 anemic women showed that 3 women (33.33%) had <15 ng/mL and 6 women (66.67 %) had between 15-150 ng/mL. **Conclusions:** Pregnancy produces relatively high iron demand. Iron requirements cannot be met merely through dietary iron intake. Even prophylactic 60 mg elemental iron giving may not be sufficient to prevent maternal anemia. Regular follow up and monitoring is essential during whole pregnancy for better management of the patients.

Keywords:- Anemia, Iron Supplementation, Hemoglobin.



INTRODUCTION

Iron deficiency anemia (IDA) in pregnancy is more of the norm than the exception in many developing countries, with a prevalence of over 52%.^[1] Since of better nutrition, the occurrence of IDA is lower in modern western nations, with about 25% of pregnant women not taking iron supplements and less than 5% of women taking prophylactic iron supplements of 40–60 mg ferrous iron per day.^[2,3] Iron deficiency is the most common dietary deficit worldwide, with a high prevalence in women of reproductive age, pregnant, and postpartum women.^[4] The World Health Organization (WHO) estimates that there are 56 million anemic pregnant women in the world, with IDA affecting the majority of these women (75–80 percent).^[1] Seven million of these women live in Europe and the Americas, with the rest 49 million staying in more or less industrialized countries. Anemia, defined as a hemoglobin (Hb) concentration less than normal,^[5] remains a significant public health concern in South and Southeast Asian (SSEA) countries, with a prevalence rate of 47% among non-pregnant women and 52% among pregnant women.^[5,6] An acceptable iron status is required to prevent maternal and fetal risk. Anemia in pregnancy is likely to increase maternal risk like pre-eclampsia, inter current infection, heart failure, preterm labor, uterine inertia, PPH and thus increase maternal mortality. A maternal anemia increase fetal risk of preterm birth, low birth weight, and iron insufficiency in infants.^[7] Also, untreated iron deficiency in the third trimester is strongly associated with postpartum IDA,^[8] which is associated with decreased physical abilities and psychic disturbances including emotional instability,

depression, stress, and impaired academic performance tests.^[9,10]

Objectives

The aim of the study was to observe the effects of WHO standard iron prophylaxis (60mg elemental iron +400 mg Folic acid) for 6 months in pregnant women.

MATERIAL AND METHODS

The present study was conducted at the department of obstetrics and gynecology, US-Bangla Medical College & Hospital, Dhaka, Bangladesh, from January 2020 to June 2021 with a sample size of 100 pregnant women. All the participants were non-anemic at the time of inclusion and were given daily 60 mg dose of elemental oral iron, and 400 mg Folic acid orally from 13 weeks onward till end of pregnancy. Follow up Hb level was measured at 20-22 week, 28-30 and at 36 weeks. When women had anemia, serum Ferritin was measured and were treated therapeutically with an increased dose of oral iron, with injectable iron or with blood transfusion as needed, depending on degree of anemia and gestational age. The collected data were analyzed by using the Statistical Package for Social Science (SPSS-24) for windows version 10.0.

Inclusion Criteria

- Pregnant women who had given consent to participate in the study.
- Pregnant women who were in their first trimester.
- Pregnant women who were non-anemic during their first visit in early pregnancy (Hb levels of ≥ 11).

Exclusion Criteria

- Mentally ill.
- Multiple pregnancy.
- Patient with chronic medical illness.
- Pregnancy with bleeding complications.

RESULTS

This study was conducted with 100 pregnant women who were non-anemic at the beginning of the study. At the time of inclusion in the study during first trimester of pregnancy, 81% had Hb levels between 11-12 gm/dl and 19% had good Hb levels of >12 mg/dl. All these non-anemic pregnant women were given prophylactic iron therapy (60mg elemental iron +400 mg Folic acid) to take daily [Table 1]. During the follow-up examination at 20-22 weeks of pregnancy, 89% were found non-anemic, 9% were mildly anemic and 2% were moderately anemic [Table 2]. Serum ferritin levels were measured in these 11 anemic women, 4 women (36.30%) had serum ferritin levels <15 ng/mL and 7 women (63.64%) had

had ferritin levels between 15-150 ng/mL [Table 3]. During follow-up at 28-30 weeks, 14% were anemic and 86% were non-anemic. One participant was severely anemic during this follow-up, 4% had moderate anemia and 9% had mild anemia [Table 4]. Among the 14 anemic women, 5 women (35.72%) had serum ferritin level <15 ng/mL, and 8 women (57.14%) had ferritin levels between 15-150 ng/mL and 1 woman had serum ferritin level more than 150 ng/mL [Table 5]. The woman with severe anemia was thoroughly investigated with full iron profile. Her Hb electrophoresis was done and she was diagnosed as a case of Thalassemia minor and was treated with blood transfusion. During the follow-up at 34-36 weeks, 1% had moderate, 8% had mild anemia [Table 6]. In total, 9 participants had anemia during 34-36 weeks of pregnancy. Regarding Serum ferritin level of 9 anemic women at 34-36 weeks, 3 women (33.33%) had S. ferritin levels <15 ng/mL and 6 women (66.67 %) had between 15-150 ng/mL [Table 7].

Table 1: Hb level in first trimester of pregnancy (at booking)

Hb (gm/dl)	Frequency	Percentage
≥11-<12	81	81
≥12	19	19

Table 2: Hb level at 20-22 week of pregnancy

Hb (gm/dl)	Frequency	Percentage
<7	0	0
7-8.9	2	2
9-10.9	9	9
≥11	89	89

Table 3: S. Ferritin level of anemic women at 20-22 weeks of pregnancy

S. Ferritin (ng/mL)	Frequency	Percentage
<15	4	36.36%



15-150	7	63.64%
>150	0	0.00%

Table 4: Hb level at 28-30 weeks of pregnancy

Hb (gm/dl)	Frequency	Percentage
<7	1	1
7-8.9	4	4
9-10.9	9	9
≥11	86	86

Table 5: S. Ferritin level of the 14 anemic women at 28-30 weeks of gestation

S. Ferritin (ng/mL)	Frequency	Percentage
<15	5	35.72%
15-150	8	57.14%
>150	1	7.14%

Table 6: Hb level at 34-36 weeks of pregnancy

Hb (gm/dl)	Frequency	Percentage
<7	0	0
7-8.9	1	1
9-10.9	8	8
≥11	81	81

Table 7: S. Ferritin level of the 9 anemic women at 34-36 weeks of pregnancy

S. Ferritin (ng/mL)	Frequency	Percentage
<15	3	33.33%
15-150	6	66.67%
>150	0	0%

DISCUSSION

During pregnancy physiological haemodilution, increase in red cell mass, increase iron demand by growing fetus and forming placenta, cause negative iron balance. These physiological changes cause decrease in hemoglobin level, increase in blood plasma level, relative to the red blood cells in almost all pregnancies.^[11] The plasma volume starts to increase rapidly at about 6 weeks of pregnancy, disproportional to the increase of red cell mass.

This disproportional increase in plasma causes a decrease in the Hb concentration levels. Increase in plasma levels is positively correlated to the healthy birth weight of a newborn, as suggested by many studies.^[12,13,14,15] To combat anemia during pregnancy, WHO suggestion is to give 60 mg elemental Iron and 400 mg Folic acid orally daily for 6 months during pregnancy along with well balanced diet. The present study was conducted with pregnant women who were non-anemic at the booking and were given iron prophylaxis according to WHO

suggestion. At the first follow up, Hb test was done at 20-22 weeks, only 11% were found anemic and 89% were non-anemic. Among them, 9% had mild anemia, 2% had moderate anemia. During the next follow-up at 28-30 weeks of pregnancy, 14% women developed anemia despite oral iron therapy and one of them developed severe anemia. Her serum ferritin level was found high (>150 ng/mL). After thorough investigation, she was diagnosed as a case of Beta Thalassemia Minor and she was treated with blood transfusion. During follow-up at 34-36 weeks, 9 women developed anemia. Among them 1 woman was moderately anemic and the other eight women had mild anemia. Here from above discussion we see most of the women were free from anemia and this suggest prophylactic iron is very very important to prevent anemia during pregnancy. However, we also see that despite oral iron prophylaxis, a large number of women still developed anemia specially in later pregnancies. This may be explained by, variable physiological demand, variable iron absorbtions from gut, non-compliance with oral iron prophylaxis, lack of dietary iron intake. Defective iron absorption may be due to gastrointestinal disorders, timing of taking oral iron that may be taking just after food or taking iron with oral calcium tablet which is usually also prescribed during pregnancy. Considering the unpredictable absorption and utilization of oral iron therapy, regular monitoring with haemoglobin level is very important so that appropriate treatment with increasing dose of oral iron therapy or injectable iron or even blood transfusion as needed can be given to combat anemia and thus preventing anemia related maternal and fetal complications.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSIONS

The study concluded that iron prophylaxis with 60 mg elemental iron and 400 mg folic acid is an effective treatment method to prevent iron deficiency anemia in pregnant women. But regular follow-up with haemoglobin level is also very important for early detection of anemia despite iron prophylaxis, to take appropriate measures to improve maternal and fetal outcome.

Recommendation

The study was conducted with a small demographic, and a follow-up study in a larger demographic is necessary. A proper counselling about the need of iron prophylaxis uring preganancy, need of taking well balanced diet, proper timing of taking oral iron that is two hour after food, to avoid taking iron along with calcium (which are usually prescribed during pregnancy), all these are important things to consider to prevent maternal anemia. Furthermore, timely follow up with Hb level is also to be done routinely, so that doses of iron can be regulated for each patient according to the necessity.

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