

EFFECT OF IRON SUPPLEMENTS ON ANEMIC PREGNANT WOMEN

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Abstract

Iron is the most important component and its deficiency causes anemia that can be very dangerous for pregnant women as well as the fetus. The study was designed to identify level of anemia in pregnant women to find out the causes of anemia and to evaluate the effect of iron supplements on anemia during pregnancy. Study was conducted in district Mianwali, Punjab, Pakistan for a period 6 months on antenatal women. 50 pregnant women of the 2nd trimester were selected for study, detailed history and questionnaire regarding socio demographic characteristics were conducted before study. Iron supplements were prescribed to the antenatal enrolled women after 1st hematological incidences. Mostly women prescribed with iron supplements that contain the equivalent of 60 mg iron and 250 µg folic acid. A blood sample was collected before and after the study (9th month of pregnancy). Patients received the iron supplementation for six months from 2nd trimester to onward then CBC results compared between before and after supplementation, which show significant difference between two values that show that iron supplements have considerable effect on anemia. Diet plays an important role in the maintenance of good health during pregnancy. The effect can be enhanced by taking iron supplements properly.

Keywords: Anemia, Iron Supplements, Deficiency, Pregnancy, Abortion

INTRODUCTION

Hemoglobin contains iron that is important part of it and this is the pigment that carries oxygen in the blood. Usually iron can be acquired by the iron containing food and recovered from old blood cells. Reduced oxygen carrying capacity of blood is known as iron deficiency anemia and is major root of microcytic hypo chromic anemia which considerably decreases the

hemoglobin per deciliter or number of red blood cells and hematocrit (Li *et al.*, 2015, 2018). Pregnant women with anemia have symptoms that include tiredness, paleness, and tachycardia and short breathing. Hazard of iron deficiency anemia in pregnant women consists of gastrointestinal problems that affect absorption, intake of food that contains less iron, short spacing between pregnancies (Bencaiova *et al.*, 2017; Shim *et al.*, 2018; Tan *et al.*, 2018). Appropriate eating is important for high quality prenatal diet and can be consequences of good eating habits throughout the life not only during pregnancy, pregnancy may also encourage improving nutrition. Deficiencies at the time of start of pregnancy may also affect the consequences of pregnancy (Crozier *et al.*, 2017; Zhu *et al.*, 2018). Nutritional status of pregnant women and consequences of pregnancy can be affected by the birth spacing and that how many times women got pregnant. Those people who are very poor and cannot manage to pay for food while rich people can afford that food. So, poor women are mostly at high risk of malnutrition (Cosgrove and Davies 1996; Zhu *et al.*, 2018).

Many factors cause anemia. Oxygen supply to fetus decreases due to iron deficiency in pregnant women and also affects intrauterine growth, and enhances the chances of pre-mature delivery and less birth weight. In developing countries results of iron supplements on pregnancy are not well documented. Birth weight is specifically linked with infant death, impaired growth and increases risk of different diseases in later life like heart diseases, high blood pressure, asthma and diabetes. Antenatal care and nutrition of mother are most significant factors of fetus development and birth weight. Many other environmental factors like smoking, cooking smoke and malaria like infection also affect it. To cure any maternal nutritional deficiencies and to fulfill requirement for fetus growth many micronutrient supplements are frequently given during pregnancy. In the world most prevalent type of malnutrition is iron deficiency. A third of world's people is suffering from it. In many developing countries specifically, it is most common problem in women (Getahun *et al.*, 2017).

Incidence of anemia among age group of women from 15 to 44 in urban areas of Pakistan stated as 26% and 47% in rural areas. Incidence of anemia is 29-50% in pregnant women that are visiting clinics and tertiary hospitals in Karachi (Bibi *et al.*, 2019). To deal with public problems, resources are limited; knowledge of the local etiological factors is accountable for anemia is vital consecutively to plan suitable prevention and treatment strategies. This study was based on the prevalence of anemia in pregnant women and effects of iron supplements on anemic pregnant women

MATERIAL AND METHODS

Research Design

The study was designed to identify level of anemia in pregnant women to find out its causes and to evaluate the effect of iron supplements during pregnancy. Study was conducted in district Mianwali, Punjab, Pakistan for 6 months on antenatal women.

Sampling Method

50 pregnant women of 2nd trimester were selected for study. Detailed history and complete medical examination were performed by physician when women were registered and enrolled in the study. Women of 1st trimester of pregnancy were not included in the study because iron supplements cannot be recommended for the 1st trimester of pregnancy.

Questionnaire

A questionnaire was prepared for participants to collect data and to analyze different reasons of anemia. The questionnaire was based on the sociodemographic characters' questions based on age, qualification, occupation and marital status etc. Questions were also included related to nutrition and antenatal history (trimester, ANC follow up, gravidity, use of iron supplements).

Follow Up

Iron supplements were prescribed to the antenatal enrolled women after 1st hematological incidences. Mostly women prescribed with iron supplements that contain the equivalent of 60 mg iron and 250 µg folic acid. All participants were kept under observation.

Sample Collection

A blood sample was collected before the study and after the study (9th month of pregnancy) in the micro cuvettes in which Ethylenediaminetetraacetic acid EDTA solution was finely spread which kept away blood from clotting. Each sample was labeled to identify by name and identification number. These samples were set aside at room temperature till processing. Sample can be stored at room temperature for 24 h for CBC test.

Analysis

Complete blood count carried out by hematology analyzer (complete blood count machine) at Indus laboratory, Kalabagh district, Mianwali. Collected data analyzed according to statistical analysis Student's paired t-test was used to compare between the two groups.

Qualitative data were analyzed using calculating frequency of data and plotting bar graph of data.

Statistical analysis

Collected data analyzed according to statistical analysis. Student's paired t-test was used to compare between the two groups. Qualitative data were analyzed using calculating frequency of data and plotting bar graph of data.

RESULTS

In this study, we observed 20% of sample participants have age group 18-25, 36% have age group of 26 -32 while 44% of the participants have age group of 33 to 38 years. Among all 32% of sample participants have no children, 50% of the participants have 1 to 2 children alive, 12% have 3 to 4 children alive while 6% have 5 to 6 children alive as shown in Figure 1.

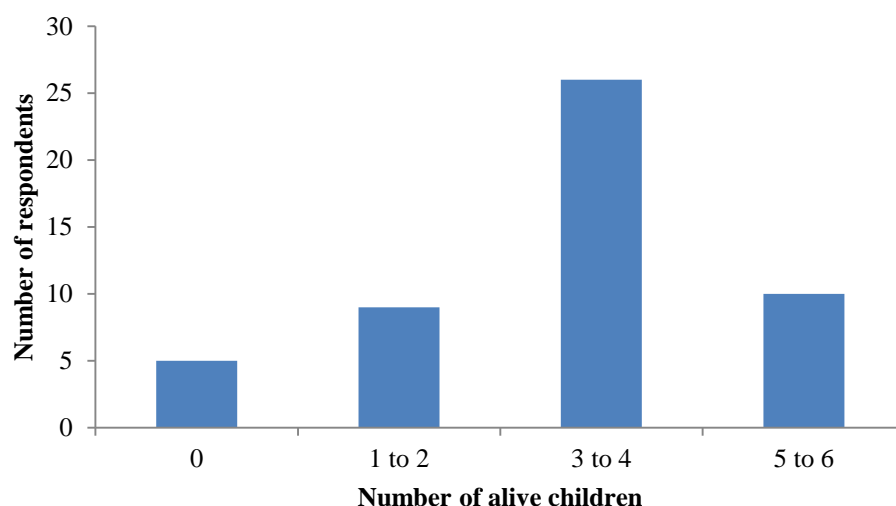


Figure 1: Number of alive children.

Table 1 indicates that 36% of the patients responded that they had an abortion earlier while 64% of the participants mentioned that they had no abortion before. Results showed that 66% of the patients feel dizziness on regular basis while on the other hand 34% of the patients mentioned that they had no such feeling of dizziness on regular basis. Table 2 data shows that 46% of the patients have the history of anemia while other 54% of patients have no anemic history.

Table 1: Information related to abortion.

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	18	36.0	36.0	32.0
No	32	64.0	64.0	100.0
Total	50	100.0	100.0	

Table 2: History of anemia.

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	23	46.0	46.0	46.0
No	27	54.0	54.0	100.0
Total	50	100.0	100.0	

32% of patients mentioned that they are vegetarian, 36% of the patients mentioned that they rarely eat red meat while 32% of the patients showed that they rarely eat leafy green vegetables. According to results it is seen that 10% of patients take meal once a day, 36% patients take meal twice a day and 54% of patients take meal thrice a day. 38% patients consume fruits and fresh juices daily while 62% patients don't consume fruits and fresh juices daily. 44% patients consume milk and yogurt daily while on the other hand 56% patients have no habits of consuming milk daily. All participants that were included do not have any blood disorder. It was revealed that none of patients have blood disorder.

46% of the patients had repeated pregnancies within less than 2 years whereas 54% of the participants declared that they had no repeated pregnancies within less than 2 years. Results showed that 58% of patients consume tea after meal whereas 42% of the patients do not have habit of taking after meal. Results showed that 46% of patients told that they eat meat once a week, 30% of the patients eat meat twice a week, 14% of patients mentioned that they use meat thrice a week and 10% of patients use meat more often.

The results also revealed that 62% patients have single type of pregnancy, 2% have twin and no one has triplet type of pregnancy while 36 % patients were not aware which type of pregnancy they have. Type of pregnancy also effects anemia. The data reveals that 8% of participants have the last child with the age of less than 1 year, 28% of the participants have child of 1 year, 38% have child with the age of 2 years, 20% of the participant's child was above 2 years and 6% participants have no children. Figure 2 illustrates that frequency distribution of age of last child of participants.

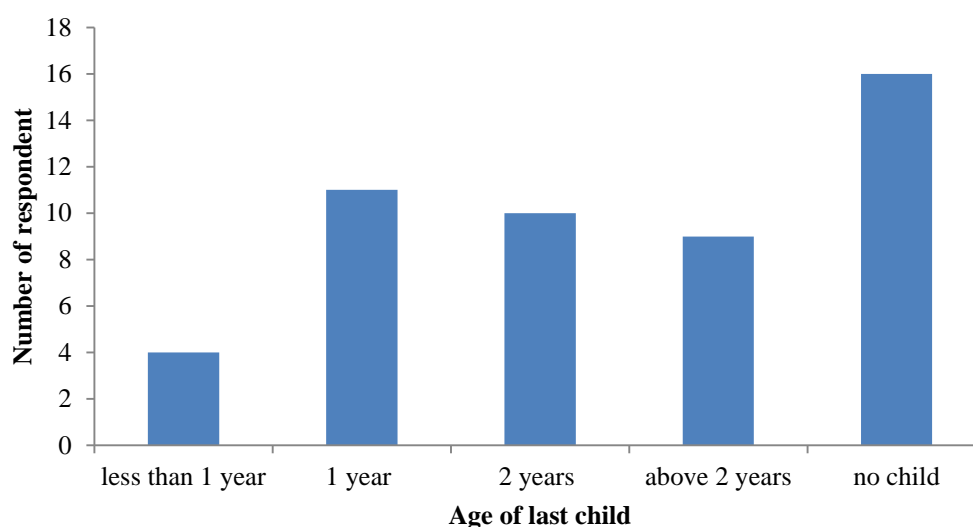


Figure 2: Age of last child.

Findings from the data indicated that there was a significant difference in patients' hemoglobin (HGB) before and after the iron supplementation (t-value =87.83235 and the p-value =.000). Mean value (8.614) of HGB before treatment and mean value (12.0942) of HGB after treatment show an increase in the HGB after treatment. It was also indicated that mean value (0.29414) HCT before treatment and Hematocrit (HCT) after treatment (0.360986) showed an increase in HCT after treatment. There is a statistically significant difference before and after iron supplementation (t value=19.4394 and p value=.000).

The mean value (67.8) before treatment Mean corpuscular volume (MCV) and after treatment MCV (76.6012) showed an increase in MCV after treatment. There is a statistically significant difference before and after iron supplementation (t value=25.72132 and P value=.000). Findings from the data indicate that there is a significant difference in patients mean corpuscular hemoglobin (MCH) before and after the iron supplementation (t-value = 22.49571 and the p-value =.000). Mean value (23.464) of MCH before treatment and mean value (29.246) of MCH after treatment show an increase in the MCH after treatment.

There is a significant difference in patients mean corpuscular hemoglobin concentration (MCHC) before and after the iron supplementation (t-value = 13.75689 and the p-value =.000). Mean value (30.548) of MCHC before treatment and mean value (33.932) of MCHC after treatment show an increase in the MCHC after treatment.

DISCUSSION

Anemia is most common disease that is prevalent all over the world and in pregnancy, it causes complications and affects the outcomes of pregnancy. To study the effect of iron

supplements on Anemia, 50 patients received the iron supplementation for six months from 2nd trimester to onward then CBC results compared between before and after supplementation, which showed significant difference between two values that show that iron supplements have considerable effect on anemia.

In this study, women 18-38 year's age group were included. Most of them were of 18-25 years. Questionnaire results provide the information that 48% participants are uneducated. The study showed that 32% of sample participants had no children, 50% of the participants had 1 to 2 children alive, and 12% of participants had 3 to 4 children alive while 6% of the participants had 5 to 6 children alive. 32% of the participants of study had an abortion earlier while 68% of the participants had no abortion before. 44% of the patients had the history of anemia while other 55% of patients had no anemic history.

32% of participants were vegetarian, 36% rarely ate red meat while 32% of participants rarely eat leafy green vegetables. Results from hematological indices show a significant difference between before and after taking iron supplements. Finding from study showed that iron supplements have positive effect on anemic pregnant women (Jia *et al.*, 2016). There was a significant difference in patients HGB before and after the iron supplementation (p-value =.000). Mean value (8.614) of HGB before treatment and mean value (12.0942) of HGB after treatment showed an increase in the H G B after treatment.

There was a statistically significant difference (p value=0) in HCT before and after iron supplementation. Effect of iron supplements on HCT showed that mean value of HCT after supplementation is higher than mean value of HCT before supplementation. Results indicated that mean value before treatment of MCV and after treatment MCV show an increase in MCV after treatment and (P value=.000) statistically significant difference before and after iron supplementation also showed positive results of iron supplementation.

There is a significant difference in patients MCH before and after the iron supplementation (p-value=.000). Mean value of MCH before treatment and mean value of MCH after treatment showed an increase in MCH after treatment. MCH value after treatment was higher than MCH value before iron supplementation. There was a significant difference in patients MCHC before and after iron supplementation. Mean value of MCHC before treatment and mean value of MCHC after treatment showed an increase in the MCHC after treatment.

CONCLUSION

Nutritional deficiency anemia during pregnancy is a major health problem in Pakistan. Education of the women as related to anemia can improve anemia. Nutritional education, with

special importance on strategies based on locally available food stuffs to improve the dietary intake of iron can also improve anemia. Treatment of chronic disease like malaria and universal antenatal care to pregnant women will help in combating this serious problem. Results indicate that routine iron supplementation during pregnancy improve maternal hematologic indices and reduce the incidence of iron deficiency anemia.

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