

Role of oral Iron therapy in anemic and non anemic pregnant women

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ABSTRACT

Introduction : Anemia is a common medical disorder affecting a lot of women in pregnancy in the developing countries. The occurrence of anaemia in pregnant women is attributed mainly to malnutrition. Anaemia might become fatal as to contribute to maternal mortality & morbidity. Hence present study is under taken to know the role of oral therapy in both anaemic & non anaemic pregnant women.

Materials & Methods: The study was conducted at antenatal OPD between October 2005 to July 2006. Ninety pregnant women were selected & divided into 2 groups. 44 normal pregnant women (control group) were compared with 46 pregnant women with anaemia (study group) aged between 20-30 years.

Haematological parameters were analysed by SYSMEX auto analyser. In current study we compared haematological responses to oral iron therapy (Zincofer) in both control & study groups. Student 't' test was used for comparison between study and control groups.

Results: The change in RBC count between the two groups was insignificant over the pregnancy period. A significant increase in Hb%, MCH & MCHC has been observed in anaemic pregnant women over the trimesters with oral iron therapy which is an indicative of increased iron absorption .

Conclusion: The study will be indicative about the rational use of iron in iron deficiency anemia. Daily oral iron supplementation is strongly recommended during pregnancy to reduce the prevalence of anemia.

Keywords: Anemia, Pregnancy, Oral iron.

INTRODUCTION

At the beginning of 19th century the word Anemia was a clinical term referring to pallor of the skin & mucous membranes. Globally Anemia is the commonest medical disorder affecting a lot of women in pregnancy. This is particularly a major health problem in developing countries. The prevalence of anaemia in countries with high development is estimated at 9%, in countries with low development the prevalence is 43%¹. The prevalence is very high in Central Asia,

especially in India^{2,3}. In India 90% of anemia cases is estimated to be due to iron deficiency, because high iron requirements during pregnancy are not easily fulfilled when iron bioavailability is poor. Religious reasons, Ignorance, poverty, vegetarian diet and gender bias significantly contribute to high prevalence of iron deficiency anaemia^{4,5,6}. Diet alone cannot supply the 30–40 mg Iron that is required for absorption of the 4–6 mg Iron/day needed during the latter stages of pregnancy. Oral iron intake is the treatment of choice for better absorption of iron.

Hence in the present study we have compared the hematological responses to oral iron therapy using the formulation of Zincofer Nature in anemic and non-anemic pregnant women. This helps us to assess the varied comparative responses in both the categories. The study will be indicative about the rational use of iron in iron deficiency anemia.

MATERIALS AND METHODS

The study was conducted in the Physiology Department of Prathima Institute of Medical sciences, Karimnagar, India .

Ninety pregnant women aged between 20 -30 years were selected for this study & divided into 2 groups (study & control). The study group was in turn divided into 3 sub groups. Each sub group comprising of 15 women in first, second & third trimesters of pregnancy with iron deficiency anaemia (Haemoglobin% is 7-9.9gm%). Control group was comprising of another apparently healthy age matched 15 pregnant women in each trimester.

Characteristics such as age, parity, weeks of gestation and literacy did not differ between the anemic pregnant women and non-anemic pregnant women.

Selected pregnant women were informed about the course and aim of the study and signed consent was obtained.

The study protocol was approved by ethical committee of Prathima institute of medical science. Predetermined exclusion criteria for the selection of the study population were pregnant women with diabetes, maternal cardiovascular disease and preeclampsia.

A detailed history was taken from all the women, and a complete physical and an obstetric examination were performed at the time of recruitment.

At enrolment 3ml venous blood was taken from each of the patients before oral iron therapy. This blood was transferred to an evacuated tube containing EDTA solution.

Haematological parameters were analysed using SYSMEX auto analyser.

Blood indices were calculated. The values for RBC count, Hb count and PCV can be used to obtain certain RBC indices (also called absolute values of blood index). These indices indicate the size and haemoglobin concentration within the RBCs and thus help in diagnosing the type of anemia.

All the women were followed up routinely until the delivery.

The selected women in all groups were given daily oral doses of 100 mg Zincofer Nature tablets which were provided every month and the women were asked to take 60 such tablets per month. They had to bring back empty packs and were also asked about the intake of their tablets and the colour of their stools to ensure that they had consumed the tablets. All the tests were done in each trimester before & after oral iron therapy.

Statistical Analysis:

Data was expressed as Mean±SD. The data was analysed by t test (MINITAB 14 SOFTWARE). $p < 0.05$, $p < 0.01$ was considered statistically significant, $p < 0.001$ was considered Highly Significant(HS) and $p > 0.05$ was considered as not Significant.

RESULTS

Table-1: Shows demographic characteristic of control & study groups of Ist, IInd & III rd trimesters of pregnant. Age, height and weight were almost similar in control & study groups of Ist, IInd & IIIrd trimesters of pregnancy. This observation was not statistically significant ($p > 0.05$).

Table 2 shows comparison of RBC count, haemoglobin concentration before oral iron therapy between control & study groups of Ist, IInd & IIIrd trimesters of pregnant women. Hb% showed a statistically significant decrease in study groups of all trimesters when compared to control group ($p < 0.001$) of all trimesters. RBC showed a statistically significant decrease in study groups when compared to control groups ($p < 0.1$) of all trimesters. Blood indices values like MCV, MCH, MCHC showed a statistically significant decrease in study groups of Ist, IInd & III rd trimesters when compared to control groups ($p < 0.05$) of Ist, IInd & III rd trimesters of pregnancy.

Table 1: The anthropometric data of the control & study groups of Ist, IInd & III rd trimesters of pregnant women

Parameters	Ist trimester			IInd trimester			IIIrd trimester		
	Control	Study	P	Control	Study	P	Control	Study	P
Maternal age(years)	22±1.9	23± 3.4	0.2(NS)	23±2	22±3	0.17 (NS)	22± 4.3	24± 3.4	0.13 (NS)
Weight(kg)	42.03±3.4	43.05±4.02	0.6(NS)	47.40±4.4	50.32±6.2	0.09 (NS)	56± 5.4	58± 2.3	0.08 (NS)
Height(CM)	140.3±3.5	141.2±4.0	0.5(NS)	140.3±3.5	141.2±4.0	0.5 (NS)	143± 2.3	142±3.3	0.4 (NS)

$p > 0.05$: Not Significant (NS), * $p < 0.05$: Significant, ** $p < 0.01$: Highly significant, *** $p < 0.001$: Very highly significant.

Table 2: Haematological & blood indices values of control & study groups

Parameters	Ist trimester			IInd trimester			IIIrd trimester		
	Control	Study	P	Control	Study	P	Control	Study	P
RBC	3.86±0.33	3.70±0.35	0.02(s)	3.83±0.34	3.70±0.38	0.04(S)	3.86±0.34	3.80±0.36	<0.1(HS)
Hb%	10.82±0.76	7.74±0.53	<0.001(HS)	11±0.84	8.27±0.62	0.000(HS)	11.49±0.76	9.27±0.66	0.04(S)
MCV	88.08±4.75	78.30±5.47	0.001(HS)	89.66±4.67	80.76±5.99	0.03(S)	91.12±3.85	83.39±6.01	0.01(S)

MCH	28.11±2.1	21.15±2.55	0.02(S)	28.79±2.12	22.56±2.89	0.01(S)	29.89±1.94	24.61±2.96	0.01(S)
MCHC	32.01±2.94	27.12±3.74	0.01(S)	32.2±3.1	28.02±3.54	0.02(S)	32.86±2.50	29.61±3.64	0.003(HS)
p>0.05: Not Significant (NS), *p: <0.05: Significant, ** p: <0.01: Highly significant, *** p: <0.001: Very highly significant.									

Table 3 shows Haematological values before & after oral treatment of control & study groups in first trimester pregnant women. A statistically non significant increase was observed in RBC, Hb% of study groups after oral iron therapy.

pregnant women. A statistically significant increase was observed in RBC count (p<0.001) in study groups after oral iron therapy than before oral iron therapy. Hb% (p<0.001) was increased much in study groups after oral iron therapy than control groups.

Table 5 shown Haematological values before & after oral treatment of control & study groups in third trimester

Table 3: Haematological values before & after oral treatment of control & study groups in first trimester pregnant women

Parameters	Ist trimester (control)			Ist trimester (Study)		
	Before	After	P	Before	After	P
RBC (millions/cumm)	3.86±0.33	3.84±0.23	0.06(NS)	3.70±0.35	4.00±0.38	0.07(NS)
Hb%	10.82±0.76	11.60±1.09	0.07(NS)	7.74±0.53	8.27±1.02	0.06(NS)
p>0.05: Not Significant (NS), *p: <0.05: Significant, ** p: <0.01: Highly significant, *** p: <0.001: Very highly significant.						

Table 4: Haematological values before & after oral treatment of control & study groups in second trimester pregnant women

Parameters	IInd trimester (control)			IInd trimester (Study)		
	Before	After	P	Before	After	P
RBC (millions/cumm)	3.83±0.34	3.95±0.89	0.06(NS)	3.70±0.38	3.98±0.95	0.002(HS)
Hb%	11±0.84	11.05±1.02	0.07(NS)	8.27±0.62	9.95±1.03	0.000(HS)
p>0.05: Not Significant (NS), *p: <0.05: Significant, ** p: <0.01: Highly significant, *** p: <0.001: Very highly significant.						

Table 5: Haematological values before & after oral treatment of control & study groups in third trimester pregnant women

Parameters	IIIrd trimester (control)			IIIrd trimester (Study)		
	Before	After	P	Before	After	P
RBC (millions/cumm)	3.86±0.34	3.95±0.58	0.01(S)	3.80±0.36	4.16±0.98	0.002(HS)
Hb%	11.49±0.76	12.01±1.23	0.03(S)	9.27±0.66	11.36±0.99	0.000(HS)
p>0.05: Not Significant (NS), *p: <0.05: Significant, ** p: <0.01: Highly significant, *** p: <0.001: Very highly significant.						

Table 4 shown Haematological values before & after oral treatment of control & study groups in second trimester pregnant women. A statistically significant increase was observed in RBC & Hb% in study groups after oral iron therapy than before treatment. Hb% was increased in study groups after oral iron therapy than control groups.

DISCUSSION

Anemia was defined according to criteria proposed by the Center for Disease Control (CDC)⁷ and refined by the National Academy of Sciences (NAS) panel on nutrition and pregnancy. During pregnancy, there are variation of hemoglobin at different trimester, the lowest values meeting this definition were 11 (first trimester), 10.5 g% (second trimester), and 11 g% (third trimester)^{8,1}.

About 1000 mg of iron is required during pregnancy. Diet alone cannot provide the extra iron which get depleted. But if iron stores are already deficient, iron deficiency anemia manifests.

In developing countries Iron deficiency anemia (IDA) is the commonest type of anemia in pregnancy⁹.

They have had nil or inadequate antenatal care and did not take iron supplements in pregnancy.

To manage anaemia administration of iron has been used by many investigators, especially in Asia and Africa, with good results¹⁰.

In the present study red blood cell values showed a better increase after the oral iron therapy in anemic pregnant women than in non anemic pregnant women of Ist, IInd & IIIrd trimesters who also had oral iron therapy.

Though there is increase in RBC in anemic pregnant women, it is not significant in control & study groups of first trimester probably due to increase in the plasma volume and reduced erythropoiesis that results in physiological anemia in pregnancy.

But there was a statistically significant increase in RBC count was observed in anaemic pregnant women in all trimesters after therapy due to improved absorption of iron. Similar reports were given by Kennedy E et al¹¹.

Hemoglobin % also improved to a greater extent in the anemic pregnant women after oral iron therapy as compared with the improvement of hemoglobin % in normal pregnant women after the oral iron therapy. It has been shown to be of significance, may be due to the rate of absorption being increased, which may be probably due to decrease in the stored iron in the body of anemic pregnant women. similar reports were given by J. B Sharma et al^{12,13}.

But according to Sood et al¹⁴ an increase in hemoglobin concentration observed in their study was due to intramuscular administration of iron or intravenous administration.

In current study we observed oral iron therapy is more effective at improving in haematological parameters in anaemic pregnant women than normal pregnant women. Similar reports were given by J. B Sharma et al¹⁵.

But according to Sharma JB et al.,^{16,17} the main problem with oral iron supplementation is poor compliance because of side effects or other reason.

Alternate strategies, such as weekly or twice weekly iron supplementation, have been developed to improve compliance.

CONCLUSION

In this comparative study, the results showed that the 2 types of women there was a significant increase in RBC, Hb% with oral iron treatment, increased storage of iron are important for further iron status. This is an important finding for developing nations like India where the prevalence of anemia during pregnancy is very high. The change in the iron status achieved with supplementation of iron is better in anemic pregnant women.

Limitation of the study:

In this study we included women with moderate anemia only, but not those with severe anemia because, for severe anemia patients, they should get the full treatment with adequate repeated intramuscular injections or blood transfusion according to the hospitals protocol.

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