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Effect of Daily versus Supervised Weekly Single Dose Oral Iron in Pregnant Women: Hematological Outcome

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Abstract
Background: *Anemia during pregnancy is an important risk factor of morbidity and mortality. Anemia especially if severe is directly or indirectly responsible for 40% of maternal deaths. Iron supplementation programmes are most practical short term approach to alleviate the problem. The present study aim to compare the effect of daily versus supervised single dose weekly oral iron supplementation, so that compliance is almost 100%, on haematological parameters in pregnant women.*
Material & Methods: *This is a prospective study of 200 women, attending antenatal clinic of department of obstetrics and gynecology, P.B.M. hospital and AG group of hospitals, S.P. medical college, Bikaner (Rajasthan). The women were randomly allocated in to two groups; one receiving daily and other receiving supervised single dose weekly iron supplementation. After taking informed consent, complete history and physical examination, all 200 pregnant women were subjected to routine antenatal investigations. Apart from routine antenatal investigation, detailed haematological work up was also done.*
Results: *In our study observed that difference of haemoglobin levels at baseline and at time of final sampling is find to be statistically insignificant ($p>0.05$). When the serum feeitin levels are compare between group A and group B, the difference at baseline is find to be statistically insignificant ($p>0.05$) whereas the difference in serum ferritin levels after 3 months oral iron supplementation is find to be statistically highly significant ($p<0.05$). In our study showed that haematological indices in group A and group B at the initiation of iron supplementation are comparable to each other. P value are not significant and after 3 month of iron supplementation there is no significance difference in haematological indices except in MCHC.*
Conclusion: *Our study concluded that weekly supervised iron therapy is cheaper, easy and more compliant & also has slightly better results than unsupervised daily iron therapy for prophylaxis of anemia.*
Keywords: *Iron supplementation, Anaemia, Hematological parameters, Pregnant.*

Introduction

Iron deficiency anemia is the most common nutrition disorder in the world.[1] Pregnant women are at special risk of developing anemia because of the extra iron required by fetus, placenta and increased maternal red cell mass in second and

third trimester. Anemia during pregnancy is an important risk factor of morbidity and mortality. In India, approximately 1.35 lacks women die from pregnancy and child birth related conditions and 20% of these deaths are contributed by anemia. Its prevalence may be high as 88% in some parts of India.[2] Anemia especially if severe is directly or indirectly responsible for 40% of maternal deaths.[3]

Iron supplementation programmes are most practical short term approach to alleviate the problem. However, routine supplementation programme such as ‘‘National Nutritional Anemia Prophylaixs Programme’’ during the fourth five year plan has not led to much alleviations of the prevalence of iron deficiency anemia in pregnancy in India due to multifactorial reasons.[4]

The main problem of daily iron supplementation is a high incidence of undesirable side effect such as epigastric pain, nausea, vomiting, constipation and diarrhoea leading to poor compliance. Large doses of iron are also associated with reduction in absorption of other elements like zinc.[5] Studies indicate that administration of daily oral iron impairs the absorption of a subsequent iron dose.[6]

All these factors have motivated a few experim-ental studies searching for alternative efficacious iron supplementation schemes that will minimize the side effects. i.e. other than routine oral iron.

While comparing daily to weekly IFA supplementation, weekly therapy is undoubtedly superior then daily in terms of reducing side effects as well as cost and improving compliance.[7]

The present study aim to compare the effect of daily versus supervised single dose weekly oral iron supplementation, so that compliance is almost 100%, on haematological parameters in pregnant women.

Material & Methods

This is a prospective study of 200 women, attending antenatal clinic of department of obstetrics and gynecology, P.B.M. hospital and AG group of hospitals, S.P. medical college, Bikaner (Rajasthan).

Inclusion criteria

1. Pregnant women<20 weeks period of gestation registered for antenatal care.
2. No history of prior iron intake.

Exclusion criteria

1. Hb level <8.5 gm/dl
2. History of chronic illness past or present pregnancy
3. History of prior blood transfusion
4. Multiple pregnancies
5. Obstetrics haemorrhage in past or present pregnancy

Methods

After taking informed consent, complete history and physical examination, all 200 pregnant women were subjected to routine antenatal investigations. Apart from routine antenatal investigation, detailed haematological work up was also done.

Two ml venous blood in EDTA vial was taken and complete blood count including Hb., Platelet, MCV, MCH, MCHC. Hematocrit was measured by Symax K 1000 analyzer machine. 5 ml venous blood was collected for serum separation and stored for ferritin estimation.

The women were randomly allocated in to two groups; one receiving daily and other receiving supervised single dose weekly iron supplemen-tation. Oral supplementation was started between 14 to 20 weeks period of gestation. Standard Government of India of NFI (large) tablets was used throughout the study. Each tablet contains dried ferrous sulphate IP 335 mg equivalent to 1000mg of elemental ferrous iron and folic acid 500µg.

Women in group A were instructed to choose any day of the week and take supervised 2 tablets direct under observation on that day either before lunch or before dinner and the regimen was repeated weekly. Women in group B was instructed to take one tablet daily and supply 3 blister packets (total 30 tablets) for one month.

History was taken for compliance and side effect were noted at each visit. Complete hemogram was repeated at 1 month and 3 month after taking iron

supplementation. Serum ferritin estimation was done at 3 month after starting iron supplementation.

Results

The present study showed maximum proportion in both groups belong to 20-24 years of age group and mean age among group A was 24.46 years whereas among group B it is 24.12 years. Hence both groups are comparable to each other (table 1). In group B maximum participants did not comply because of side effects, the reason of noncompliance are significantly associated with the mode of iron supplementation (p=0.04) (table 2).

In our study observed that difference of haemoglobin levels at baseline and at time of final sampling is find to be statistically insignificant (p>0.05) (table 3). When the serum feeitin levels are compare between group A and group B, the difference at baseline is find to be statistically insignificant (p>0.05) whereas the difference in serum ferritin levels after 3 months oral iron supplementation is find to be statistically highly significant (p<0.05) (table 4).

In our study showed that haematological indices in group A and group B at the initiation of iron supplementation are comparable to each other. P value are not significant and after 3 month of iron supplementation there is no significance difference in haematological indices except in MCHC (table 5).

Table 1: Distribution of cases according to age

Age group (yrs)	Group A		Group B	
	No.	%	No.	%
<20	18	18.0%	19	19.0%
20-24	40	40.0%	41	41.0%
25-29	41	41.0%	38	38.0%
30-34	1	1%	2	2.0%
Total	100	100%	100	100%
Mean	24.46		24.12	

Table 2: Distribution of cases according to reasons for noncompliance to oral supplementation

Reason for compliance	Group A		Group B		P value= 0.04
	No.	%	No.	%	
Side effect	4	57.14%	17	60.71%	
Refused blood sampling	0	0%	6	21.42%	
Ignorance and casual attitude	3	42.86%	5	17.85%	

Table 3: Comparison of haemoglobin levels among cases at baseline and after 3 mponths.

Hb levels (g/dl)	Group A	Group B	P Value
Baseline	10.07±1.14	10.08±1.42	0.294
After 3 months	10.57±1.32	10.24±1.50	0.726

Table 4: Comparison of S-Ferritin levels among cases at baseline and after 3 mponths.

S-ferritin levels (ng/ml)	Group A	Group B	P Value
Baseline	9.55±7.75	9.28±7.16	0.591
After 3 months	15.38±6.81	11.05±4.39	0.0001

Table 5: Comparison of haematological indices levels among cases at baseline.

Hematological Indices	Group A		Group B		P Value	
	Baseline	After 3 month	Baseline	After 3 month	Baseline	After 3 month
HCT (%)	33.36±4.19	35.22±4.86	35.26±4.30	35.28±4.61	0.214	0.521
MCV (fl)	85.06±10.86	87.54±10.86	85.74±8.86	86.71±8.57	0.421	0.598
MCH (pg)	27.13±3.74	28.86±5.61	26.67±3.84	27.76±4.09	0.412	0.189
MCHC (gm/dl)	30.73±3.08	33.98±3.08	30.04±3.13	30.65±3.71	0.67	0.004

Discussion

Iron deficiency is the most prevalent single nutritional deficiency, nearly 50% of women with iron deficiency anaemia. Iron-folic acid (IFA) supplementation given daily from early pregnancy has long been the recommended standard approach to prevent and treat anaemia. Though efficacious, daily IFA programs have limited success in reducing anaemia in developing countries because of many reasons.

In our study showed that the range of age of study participants (20-35 years) with a mean of 24.46 years in group A and 24.12 years in group B. The two groups were comparable with respect to the distribution of the age of women. This study group is comparable with a study conducted by Mumtaz et al[8] where mean age of weekly group was 24.4 years and in study by Shankar H et al[9] age group was 17-35 years.

The present study observed that 93.45% group A patients and 78.12% group B patients complied to iron supplementation. The difference between compliance of daily and weekly supplementation was found to be statistically highly significant (p=0.0001). In the study by Ridwan et al[10] 63% of weekly and 48% in daily groups had compliance. Our study had much better compliance in group A reason being supervised oral iron supplementation and also in group B may be because of better antenatal care. In group A there is 7 patients show noncompliance due to side effect, ignorance and casual attitude whereas in group B 28 patients shows noncompliance due to side effect, refusal for blood sampling, ignorance and casual attitude. P value is significant (p=0.04). The main problem of routine iron supplementation is a high incidence of undesirable side effects such as epigastric pain, nausea, vomiting, constipation and diarrhoea leading to poor compliance. According to Galloway and Mc Guire[11], because of low GI side effects supervised weekly iron supplementation has better compliance than daily supplementation. Goshtasebi et al[12] concluded that frequency of nausea, vomiting and constipation were significantly lower in the twice weekly group. Godara S et al[13] observed in their study that compliance among pregnant women, regarding iron supplementation, was observed by 80.47% women, noncompliance was observed by 14.42%. The reasons for noncompliance were side effects 29.03%. Sipra B et al[14] observed that compliance was better and side effects were less in weekly iron as compared to daily iron therapy (11.36% versus 39.9%).

In our study observed that difference of haemoglobin levels at baseline and at time of final sampling is find to be statistically insignificant (p>0.05). The haemoglobin levels is comparable to previous studies.[9,12,14] When the serum feeitin levels are compare between group A and group B, the difference at baseline is find to be statistically insignificant (p>0.05) whereas the difference in serum ferritin levels after 3 months oral iron supplementation is find to be statistically highly significant (p<0.05). Increase in serum ferritin is a reflection of increase of increase in storage iron. Serum ferritin level change in our study are comparable to similar studies previously conducted.[10]

In our study showed that haematological indices in group A and group B at the initiation of iron supplementation are comparable to each other. P value was not significant. Our study groups are comparable to the other studies.[15,16] After 3 month of iron supplementation there is no significance difference in haematological indices except in MCHC. Results of changes in haematological indices in our study are comparable to previous studies.[15]

Conclusion

Our study concluded that weekly supervised iron therapy is cheaper, easy and more compliant & also has slightly better results than unsupervised daily iron therapy for prophylaxis of anemia. Our study is very small, large field based and multi-centric studies are required to substantiate the iron supplementation efficacy of supervised weekly iron supplementation as public health strategy.

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