

## POOR IRON COMPLIANCE - THE WAY OUT

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### SUMMARY

Nutritional anaemia is not only an obstetric problem but is also a public health problem. Iron deficiency is the most common deficiency in India. Though oral iron is safe, cheap and effective, there is problem with compliance. Moreover the supply of iron tablets in government institutions is erratic, irregular and inadequate. The authors initiated a comparative study of 100 tablets of oral iron in one group of pregnant women against two injections of iron-dextran (250 mg each) given intramuscularly at 4 week interval. Only 36% of women on oral iron consumed more than 90 tablets. The haemoglobin rise was not very noticeable when less than 30 tablets were consumed. With two injections of iron-dextran, compliance rate was excellent and side effects within acceptable limits. It is concluded that intra-muscular iron is a cost-effective means of providing supplementary iron to women where antenatal care and patient compliance are minimal.

### INTRODUCTION

Pregnancy anaemia is a global problem. Large majority of pregnancy anaemias are nutritional in origin. Iron deficiency is most prevalent among women in developing world. The iron stores are negligible or absent in most women of child-bearing

age in India (Bhatt-1995). The cause of iron deficiency is repeated pregnancies, hook-worm and malaria, heavy menstrual blood loss and poor diet. Therefore it is logical to give supplementary iron to all pregnant women in India and other developing countries. Though oral iron is safe, cheap and effective therapy, problem of compliance is a disturbing feature. Lack

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of compliance to iron is a universal problem as shown in Table I. Public hospitals are be considered as an alternative when speed of response becomes critical in the later

**Table I**  
**NONCOMPLIANCE/DROP OUT RATE**

Author		Country	Noncompliance/ drop out rate
Sood et al	(1975)	India	30%
Iyanger	(1970)	India	65%
Kuizon	(1979)	Philippines	50.7%
Srisupandit	(1983)	Thailand	17.6%
Bonnar	(1969)	U.K.	33%
Charoanlarp	(1988)	Thailand	10-35%

not able to ensure regular supply of iron and hence irregular, erratic and inadequate supply also help in aggravating iron deficiency. Vijayraghavan and Braliman (1969) made this observation while evaluating the National Nutritional Anaemia Prophylaxis Program (NNAPP) of government of India. Sometimes there is a need to raise the haemoglobin quicker especially in the third trimester of pregnancy or when haemorrhage or surgical interference is anticipated. Though haemoglobin response to oral and parenteral iron therapy may be similar over a period of time, the immediate response is quicker with parenteral iron. Hillman & Aerderson (1969) concluded that parenteral route can provide greater amount of iron than the oral route and erythropoiesis can be increased 6-8 times over the basal level after parenteral iron as compared to 3-4 times after oral iron. Therefore parenteral iron therapy should

weeks of pregnancy or when women cannot be relied upon to take oral iron. Noncompliance is usually related to medical or socio-cultural factors. It may be colour or taste of the iron preparation or the form (liquid, tablet or capsule) or the side effects like nausea, abdominal discomfort, constipation, diarrhoea etc.

Since anaemia is the greatest killer disease for pregnant women, there is need to develop strategies to improve the iron status of all women in general but pregnant women in particular. It is true that education, motivation, persuasion and good supervision may improve compliance to oral iron. This may take time - may be one or two decades. We must therefore consider alternate routes for iron therapy during this transition phase. Demayer (1981) suggested that administration of single intra-muscular or intravenous dose of iron may be an alternative approach to oral iron therapy.

### **AIMS AND OBJECT**

Paparella & Papadia (1990) has estimated the iron requirement during pregnancy as 400-1200 mg. The fetus takes away 300 mg. iron. The increased maternal red cell mass takes 300-540 mg. iron. The red cell mass would return to normal after delivery and hence this iron is not lost to the woman. Therefore effective iron requirement during pregnancy is 600-800 mg. Ideally 1000 mg. iron is needed intramuscularly to cover total need during pregnancy as well as help in building iron stores. This would need 5-10 injections which may not be acceptable to all pregnant women. Therefore we considered to administer 500 mg. iron to see if compliance rate is high. Prema (1982) reported drop-out rate of 14 percent when 1000 mg were administered. If the drop-out rate could be reduced, it would mean a great programmatic advantage because more women would improve the haemoglobin status above the critical level. The principle object of the study was to find out the compliance rate with two injections of iron dextran (total 500 mg) and find out if the haemoglobin level can be raised above the critical level. This would reduce maternal morbidity and mortality.

### **MATERIAL AND METHOD**

One hundred women between 12-20 weeks of pregnancy were taken for the study. Women with associated diseases like heart disease, tuberculosis, diabetes etc. were excluded. Women with haemoglobin less than 11 gm. percent were enrolled. The women were randomly allocated for oral or parenteral iron therapy. The women in oral iron group were given one tablet of Macrafolin with iron (Glaxo) for 100

days. Each tablet contains 200 mg. ferrous fumarate, 750 mcg. folic acid and 7.5 mcg vitamin B12. Only 30 tablets were given after proper explanation and they were advised to return for collection further packet of iron tablets. This ensured better supervision and monitoring. The remaining women were administered 250 mg. iron dextran (Imferon) intramuscularly in the buttock with the Z technique. Presterilised disposable syringes and long needles were used. The injection was repeated after 4 weeks. Thus total of 500 mg. of iron dextran was given. The patients in both the groups were asked to volunteer any side effects during the follow up visit. Direct questions were not asked to elicit side effects. Patients were asked if there were any unconsumed tablets. Antenatal care was given and the patients were followed through labour and puerperium. Haemoglobin estimation was repeated two weeks after last iron tablet or injection.

### **ANALYSIS AND DISCUSSION**

There was no significant difference in haemoglobin values between the patients selected for oral and parenteral therapy (Table II). The women with haemoglobin less than 5 grams were in the early weeks of pregnancy (less than 16 weeks). The noncompliance rate was high. Only 18 patients (36%) consumed more than 90 tablets. Six patients consumed less than 20 tablets (Table III). Only one patient in the parenteral group did not come for the second injection because she went to her parents, place for delivery and returned for follow up after delivery. Table III shows the haemoglobin rise in relation to the number of tablets consumed. The haemoglobin rise was almost similar

**Table II**  
**INITIAL HAEMOGLOBIN**

No. of patients Oral route.	Haemoglobin value Grams. percent	No. of patients IM route
3	Upto 5	4
16	5.1 - 7	14
31	7.1 - 11	32

**Table III**  
**HAEMOGLOBIN RISE AFTER THE THERAPY**

Haemoglobin Grams. Percent	No. of tablets			consumed 90+	Intra- muscular iron
	1-30	31-60	61-90		
Upto 5	0	0	0	0	0
5.1 - 7	6	2	0	0	0
7.1 - 9	0	9	5	2	2
9.1 - 11	0	0	10	12	32
11.1 +	0	0	0	4	16
<b>Total</b>	<b>6</b>	<b>11</b>	<b>15</b>	<b>18</b>	<b>50</b>

**Table IV**  
**REASONS FOR NONCOMPLIANCE AND SIDE EFFECTS**

Oral Iron		Parenteral Iron	
Forgetfulness	14	Drop out	1
Abdominal discomfort	8	Pain at injection site	14
Loose motion/ constipation	4	Staining of skin	6
Nausea	8	Bodyache, arthralgia	
		fever	3
		Injection abscess	Nil

between oral and parenteral group when more than 90 tablets were consumed. However, the haemoglobin response was poor when less than 60 tablets were consumed. The haemoglobin was less than 7 grams in all the 6 patients who consumed less than 30 tablets.

The drop out rate and side effects in both groups are presented in Table IV. Side effects to oral iron is the most common cause for noncompliance. Nausea, abdominal discomfort and loose motion or constipation are the common side effects noted. In the parenteral group, pain at the injection site was noted in 14 patients. Bodyache, fever, arthralgia and skin staining were other side effects noted. There was no case of injection abscess or severe reaction to parenteral iron.

The study confirms that non-compliance rate to oral iron is significantly high. This prevents improvement in haemoglobin status. The noteworthy observation is that there is no significant difference in haemoglobin values between oral and parenteral group when more than 90 tablets are consumed. But only 36 percent of the patients consumed more than 90 tablets. Therefore more than 60% of pregnant women with poor compliance are at risk if there is sudden blood loss during pregnancy or labor. It is difficult to predict accurately as to who would have good compliance and who would have poor compliance. We recommend that following criteria may help in determining women who may need parenteral iron.

1. Women with iron intolerance in previous pregnancy
2. Women staying far away from nearest health center facility.

3. Women in later weeks of pregnancy with low haemoglobin.
4. Women who are likely to need surgery for obstetric reasons.
5. Women who default in current pregnancy.

There are several studies showing efficacy of intramuscular iron during pregnancy. Prema (1982) reported her experience with 302 pregnant women who were given 100 mg. iron-dextran intra-muscularly daily for 10 days. The compliance rate was 87 percent. She further reports that no woman in her series had haemoglobin less than 8 gm. percent at the time of delivery. Jenkinson (1984) injected 5 ml (250 mg.) iron dextran intra-muscularly in each buttock at one sitting (total 500 mg.). The haemoglobin rise was satisfactory as compared to the group receiving oral iron. The authors conclude that though the cost of intra-muscular iron is greater than therapeutic doses of oral iron, it is still cost effective means providing supplementary iron to women where antenatal care and patient compliance are minimal. Prema (1982) concludes that women from low socio-economic group seldom take iron tablets with any regularity, yet will readily accept injections.

#### CONCLUSIONS

1. The compliance to oral iron is poor.
2. The women with low compliance have poor haemoglobin rise.

3. The intra-muscular iron dextran is well accepted and tolerated by pregnant women.
  4. Parenteral iron two doses (500 mg) is recommended for women who show iron intolerance or are poor compliant for oral iron.
  5. Women in remote rural areas and urban slums are good candidates to initiate with two doses of parenteral iron.
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