

# Iron Supplementation for Controlling Anaemia in Pregnancy by Involving FCHVs in Saralahi

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### Abstract

Anaemia in pregnancy, mainly iron deficiency, is a public health problem. The present study aimed to determine the effect of iron supplementation in pregnant women in Saralahi District for reducing the prevalence of anaemia. For this purpose 80 pregnant women, with haemoglobin >7.0g/dl in 12-34 weeks of pregnancy, were selected in the study by using participation of FCHVs. Giving 120 mg of iron supplementation per day for 1 month, their haemoglobins were reassessed to determine the effects of iron.

The prevalence of anaemia in the current study found was 52.5%. The mean haemoglobin (n=80) was 10.585 g/dl with confidence limits of 10.31-10.86 (5% significance level).

After iron supplementation, the prevalence of anaemia was reduced to 2.5% (P=0.001 at 99.73 confidence level). The mean haemoglobin was increased to 13.14 g/dl. (P=0.001). The per day increase of haemoglobin was 0.09 g/dl. The increase in haemoglobin was inversely related to the severity of anaemia ( $r = -0.93$ ,  $P < 0.001$ ). The increase in haemoglobin after Fe supplementation was more in the group of pregnant women of the third trimester than in the group of pregnant women of the second trimester. The increase was highly significant ( $P < 0.01$ ).

*Keywords: Iron deficiency; anaemia; pregnancy; iron supplementation; FCHV; Sarlahi.*

Anaemia of pregnancy due to iron deficiency is recognized as a major public health problem worldwide including Nepal. About 616 million iron deficient or anaemic persons live in the South East Asia Region with the prevalence around 74%<sup>1</sup>. The prevalence of anaemia in Nepal is 76.6 % among pregnant women<sup>2</sup>. Approximately 81.3% of anaemia in pregnancy are due to iron deficiency.<sup>3</sup> Low dietary intake of iron and its poor bioavailability in cereal-based diets appear to be among main factors responsible for anaemia. Compliance problems are slowing down the iron supplements approach. Low birthweight is especially associated with low hemoglobin level in pregnancy.<sup>4-7</sup>

### Statement of problems

Anaemia of pregnancy is decrease of haemoglobin below 11g%. Anaemia of pregnancy is due to iron deficiency and is recognized as a national health problem in Nepal .The literature reviews showed that the prevalence of mild anaemia (100-109 g/l) is 29.8%, moderate anaemia (70-99g/l) 36.5%, moderate anaemia and severe anaemia (less than 70g/l) is 4.2% and for all pregnant women it is 70.6% in Nepal.<sup>2</sup>

Efforts to distribute iron and folic acid supplements to all pregnant women in rural areas through the regular health services have had little impact because most of the women have no effective contact with health care service personnel and fairly receive antenatal care.<sup>8,9,10</sup> The other major reason for the failure of iron therapy is low coverage due to difficulty of sustaining motivation for two to three months in patients who do not perceive themselves to be ill.<sup>11,12</sup>

## **RATIONALE OF THE STUDY**

Iron requirement increases in pregnancy due to demands of the foetus and increase in the blood volume, especially in the last two trimesters, with up to 80% of the requirement. The total iron requirement over the whole pregnancy is about 1000 mg. Therefore, the extra iron requirement for iron has to be met by the body's iron stores. However, iron stores are low or absent in the great majority of women in developing countries due to poor diet, low in iron, chronic blood loss from parasitic infection and frequencies. An overt haemoglobin iron deficit is present when the haemoglobin concentration is less than 12 g/dl. Pregnant women cannot meet their iron requirement through the diet alone. Therefore, supplementation with iron pills is necessary. Factors limiting effectiveness are high.<sup>13,14,16-29</sup>

If services of community health volunteers could be used to ensure regular intake of iron folate medication especially among rural pregnant women, oral iron therapy may prove to be a useful method of tackling the problem of anaemia in rural areas and can increase the compliance since a ward level female community health volunteers(FCHVs) serves as a valuable link between the health services and the community; the acceptance of health services can be increased by mobilizing them.<sup>6,11,22,30-32</sup>

## **Research Question**

What will be prevalence of anaemia after 1 month supplementation on 120mg of iron tab. /day by using participation of FCHV in the community ?

## **Objectives**

The general objective of the study was to determine the effects of iron supplementation in pregnant women of **Chandranagar** and **Nokailwa** Village Development Committees (VDCs) in Saralahi District of Nepal. The total population estimated in two vdc's was 14000 approximately.

## **Specific Objectives**

1. To identify the initial and post Fe supplementation level of haemoglobin in pregnant women of above first trimester for different degrees- mild, moderate and severe.

INCLUSION CRITERIA was to include pregnancy women between 12 to 34 weeks with Hb level >7.0 g/dl, and willing to participate in the experiment.

## **FIELD PROCEDURE**

The study was limited with the aim to submit report to the Institute of Medicine for the partial fulfilment of MPH course.

The study was conducted in an informal experimental design on 80 subjects obtained by systemic random sample method. The data were collected by Sahli's method. To minimize the technical errors, an experienced hospital laboratory technician was hired. Two health assistants and two village health workers were hired to execute the study and to control unwanted side effects of drugs for ethical consideration.<sup>33,34</sup> A one-day orientation regarding anemia, its risk and importance of

iron supplementation was given to FCHVS of two vdc's to obtain their participation. A three-paged study sheet written in Nepali was given to each FCHV. Iron tablets were provided in a plastic container(batta), each with 60 tabs to the pregnant women. The second phase result study for Hb measurement was done on the 31st day.

Literature Review

Erythropoietic activity following iron administration is directly related to severity of anaemia, the increase in haemoglobin concentration being inversely proportional to the initial concentration. A positive response to treatment on 120 mg of elemental iron can be defined as a daily increase in haemoglobin concentration of about 1 g/l/day from the fourth day on (approximately 7g/l/w), with normal levels reached within 4 to 8 weeks depending on the original severity of the anaemia. Iron treatment should continue for at least another 2 to 3 months to build up iron stores to about 250-300mg. A daily dose of 120 mg iron per day as ferrous sulfate (fersolate, glaxo) for 10 to 12 weeks caused a mean rise in the haemoglobin concentration of 1.2 g/dl in a group of pregnant women at 26 +/- 2 weeks of gestation.12-15,22,35,36

Mobilization of female health volunteers may increase coverage and compliance of iron supplementation, since they serve as a valuable link between health services and the community 11,13,37-45

Result "A"

Prevalence of anaemia in pregnant women (n=80) was 52.5%.42 Of them the mild type of anaemia was 27.5% and the moderate type was 25%.20 Severe anaemia was not found as shown in table No 1.The mean Hb of all subjects was 10.585g/dl.

The mean age of respondents was 24.34 yr. The highest number of pregnant women was 30(37.5%) in the age group 20-24 yrs. The respondents were grouped into trade holder, service holder, land owner and hired labourer. Most of the respondants, 41(51.25%), were from labour group family. Anaemia was equally prevalent in other social classes. There was no association with any social class (P=0.8315). Their standard of living and dietary pattern were not much different. Most of the women were illiterate 76(95%). Of them, 40(52.63%) were anaemic.

The mean week of pregnancy was 21.74. Anaemia was equally prevalent in second and third trimester of pregnancy (p=0.1962). 14(23.33%) multiparous pregnant women had conceived pregnancy within 2 years after their previous pregnancy. 46(76.67%) respondents had elapsed more than 2 years when they became pregnant again. The number of women in the first parity was 20(25%). The number in the 6th parity and above was 7.5%. The prevalence of anemia had not shown association with any parity (p=0.51129,d.f=4).

Result "B" (second phase)

Before the treatment the prevalence of anaemia was 52.5% and after the treatment the prevalence of anaemia was 2.5%. Distribution of 120mg of iron tab daily for one month with involvement of FCHVS reduced the prevalence of anaemia to less than 9 (a low prevalence criteria set by WHO, 1991) from current level of high prevalence (>40,WHO, 1991). See table No I and fig. No 1.

Table I: Blanket Coverage Treatment

Hb level	Hb first	Hb second
No.	Percent	No. Percent

7-7.9	1	1.25	0	0
8-8.9	4	5	0	0
9-9.9	15	18.75	0	0
10-10.9	22	27.5	2	2.5
Sub Total	42	52.5	2	2.5
11-11.9	24	30	10	12.5
12-12.9	11	13.75	11	13.75
13-13.9	3	3.75	32	40
14-14.9	0	0	19	23.75
15-15.9	0	0	5	6.25
16	0	0	1	1.25
Total	80	100	80	100

**Fig. 1:** Blanket coverage (before and after Hb)

The mean Hb of 10.585 g/dl of 80 pregnant women due to iron supplementation for one month had increased to 13.14 g/dl ( $p=0.0010$ ). Two pregnant women still remained anaemic even after the treatment and their mean Hb was 10.5 g/dl. The increase in Hb was 2.55 g/dl of one month iron supplementation and per day increase in Hb was 0.09 g/dl.

The increase in Hb was highly correlated with the iron supplementation ( $r=0.97$ ) and the increase in pregnant women had very high significant correlation ( $P<0.001$ ). On following iron supplementation, haemoglobin increased in relation to previous level of Hb ie the increase in Hb was inversely related to the severity of anaemia ( $r=-0.93, p<0.001$ ). By the use of regression lines prepared from this study one can estimate the Hb second following iron supplementation by giving 120 mg of iron/day and by knowing woman's previous Hb, for example, from 7 g/dl to 10.7 g/dl, from 8 g/dl to 11.37 g/dl, and from 11 g/dl to 13.38 g/dl and so on. The equations are as follows:

$$X \text{ mean} = 10.16, y \text{ mean} = 12.82$$

$$X = -8.17 + 1.43 y \text{ -----(1)}$$

$$Y = 6.01 + 0.67 x \text{ -----(2)}$$

## Discussions

### Prevalence Study

The prevalence of anaemia found in the present study is 52.5%, very consistent with the prevalence (48%) found in the previous study.<sup>7</sup> However, this is very much less than the prevalence of 70% found from the recent study<sup>2</sup>, and from the prevalence of 63% as shown by the Annual Report of

Department of Health Services (1996/97).<sup>6</sup> This prevalence of anaemia detected by the current study is less than the overall prevalence of pregnant anaemia of 74% in South Asian region.<sup>1</sup>

This prevalence of anaemia is less than the prevalence found in Bangladesh (77%), also than that in India 72% (1996). But very similar to the prevalence of pregnant anaemia 49%, in another study, and however, and more than the prevalence of 38.6% in Sri Lanka (1996).<sup>12</sup> The prevalence of pregnant anaemia found in Pakistan is in primipara (16%), gravida 2-6 (16%), and gravida > 7 (38%), in the 3rd trimester (23%).<sup>12,18</sup>

## **Iron supplementation**

In the present study, anaemia reduced from 52.5% to 2.5% in one month by finding the same dose of iron supplementation.

The haemoglobin increment is also very identical to the positive response to iron supplementation as a daily increase in haemoglobin concentration of 0.1 g/dl mentioned in the reports of WHO and UNICEF and also very near to 180 mg/day treatment.<sup>12,13,35</sup>

The increase in haemoglobin in the current study is similar to the increase of haemoglobin of 2.5 g/dl after one month supplementation on 100 mg ferrous iron thrice daily of the study by A. Norrby and L. Solvell, 1974 (229) of Iron deficiency anaemia by Bothell Thomas H. 1999.<sup>14</sup>

The increase in Hb after iron supplementation was highly significant in women in third trimester than in the women in second trimester ( $P < 0.01$ ). This evidence supports the previous literatures. This may be due to the fact that iron binding capacity is frequently and significantly high in the third trimester than in the second trimester. This maybe due to the greater increase of plasma volume in the third trimester.<sup>29</sup>

## **Conclusions**

### **Prevalence study (Phase-I)**

The prevalence ( $n=80$ ) of anaemia ( $< 11$  g/dl) was high ie 52.5% (42), moderate anaemia (7– 9.9 g/dl) was 25% (20) and mild anaemia (10-10.9g/dl) was 27.5% (22). Mean Hb of all respondents was 10.58 g/dl with SD of 1.264. The haemoglobin of anaemic subjects was 9.88 g/dl. The confidence limits from sample mean was 10.31-10.86 g/dl (5% significance level) and 10.22-10.93 g/dl (1% significance level).

No pregnant women took iron tablet in their previous pregnancies and most of them were unfamiliar with the iron supplementation.

### **Supplementation (Phase-II)**

The prevalence of anaemia followed by one month supplementation of 120 mg iron/day was reduced to 2.5% (low prevalence (9-1, WHO, 1991) ( $P = 0.0010$ ) from 52.5% with the increase of the mean haemoglobin up to 13.14 g/dl from 10.585 g/dl being supplied by FCHVs ( $P = 0.0010$ ),  $R = +0.97$ , ( $P < 0.001$ ). The increase in haemoglobin by iron supplementation was inversely related to the severity of anaemia ( $r = -0.93$ ) ( $P = 0.001$ ). The haemoglobin increase after one month of 120 mg of iron supplementation was 2.55 g/dl with per day increase of 0.09 g/dl/day.

The difference of increase in haemoglobin concentration between second and third trimester group was 0.3 g/dl. The increase of haemoglobin of the 3rd trimester was highly significant ( $P < 0.01$ ).

During the prevalence study (first phase), out of 80 respondents, one 1.25% (1) had knowledge that she should take iron tablet during pregnancy, while in the posttest (II phase study) most of them,

92.5%, were able to specify the knowledge of importance of iron and showed willingness to continue to take it throughout pregnancy. Orientation increased the knowledge of FCHVs. This increased knowledge diffused among the group of pregnant women to sustain the compliance of treatment and to minimize the dropouts.

## Recommendations

1. For the prevention and treatment of anaemia, 120 mg of elemental iron (one tab twice daily) during the 3rd trimester of pregnancy should be distributed by FCHVs through health facilities.
2. A one-day orientation to female community health volunteers (FCHVs) regarding consequences of anaemia and the importance of iron supplementation should be given during their review meetings and the chapter should be included in their training manual.

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