



ROLE OF IRON SUCROSE INFUSION IN THE IMPROVEMENT OF HAEMOGLOBIN LEVEL IN PREGNANT WOMEN IN A RURAL AREA OF CHENGALPATTU DISTRICT-TAMILNADU.

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ABSTRACT

Introduction: Anaemia is a serious public health problem which is prevalent among young children and pregnant women. WHO defines anaemia as haemoglobin (Hb) <11 g %l In India, the ICMR classification of iron deficiency anaemia is: 8-11 g % as mild, 5-8 g % as moderate and <5 g % as severe anaemia. This study is mainly to assess the effect of Iron sucrose infusion in the improvement of hemoglobin level in pregnant women in a field practice area of rural Block PHC- Chunampet, Tamilnadu. **Methodology:** Government Block Rural PHC-Chunampet is the only Government health facility in that area, surrounding 15 km. In Government Block Rural PHC-Chunampet, they are regularly monitoring haemoglobin level to rule out anaemia and providing iron sucrose infusion depending upon the hemoglobin level for improvement of anaemia. We have reviewed the data from January-2021 to December-2021. All Pregnant women who visited Government Block Rural PHC-Chunampet during the study period, (from January-2021 to December-2021) were included in the study. We entered the data in excel sheet and analyzed using SPSS version 21.0. **Results:** Among the 143 study participants, 67 (47.9%) participants belonged to the age group 21-25 years and 52 participants (36.4%) belonged to the age group 26 - 30 years Before Iron sucrose Intervention, the mean Hb level was 9.023 (+ 0.77). After Iron sucrose Intervention, the mean Hb level was 9.755 (+ 0.79). **Conclusion:** The study has shown that iron sucrose injection has been effective in increasing the Hb levels in all gestational ages of pregnancy. The intervention proved to be most effective in primi gravida women, reducing the number of women with Hb less than 10g/dl by 37.1% from 96.6% to 58.6% after administration of iron sucrose.

KEYWORDS

INTRODUCTION:

Anaemia is a serious public health problem which is prevalent among young children and pregnant women. Anaemia during pregnancy is a known risk factor for preterm birth, low birthweight and small-for-gestational age babies, and increases the risk of postpartum haemorrhage (PPH). WHO defines anaemia as haemoglobin (Hb) <11 g %l In India, the ICMR classification of iron deficiency anaemia is: 8-11 g % as mild, 5-8 g % as moderate and <5 g % as severe anaemia. According to WHO, the prevalence of IDA is about 18 per cent in developed countries and 35-75 per cent (average 56%) in developing countries. During 10th Five Year Plan (2002-2007)4, a study conducted by ICMR5 showed that the prevalence of anaemia was highest among pregnant women (50-90%) and that of moderate (<8 g%) and severe anaemia (<5 g%) was persistently high. Globally, the prevalence of anaemia is 55.9 per cent with variations between developed and developing countries(1). In India, prevalence ranges between 33-89 per cent (2). Anaemia is a condition in which the number of red blood cells are reduced or Haemoglobin concentration within them is reduced. As a result there will be decreased capacity of blood to carry oxygen to the body tissues resulting in symptoms such as weakness, dizziness, fatigue or shortness of breath. The most common cause of anaemia include iron deficiency, vitamin B12 and folate deficiency.

Other causes include hemoglobinopathies and infections. The prevalence of anaemia is especially high in developing countries compared to developed countries due to various reasons like poverty, frequent pregnancies, poor access to health services and certain infectious diseases. Other factors include inadequate Iron rich diet, poor compliance and infections. Though Indian diet constitutes iron rich food products, the lack of awareness among the majority in rural India has also been a contributory factor. Side effects such as heart burn, nausea, diarrhoea, constipation are some of the reasons for the poor compliance to iron tablets by pregnant women. In tropical countries like India, especially rural areas, parasite infestation like

hookworm is a major cause for Iron deficiency anemia owing to poor hygiene. Untreated anaemia in pregnancy can have potential risk of preterm or low birth weight babies, neural tube defects and developmental delays. It can also cause maternal postpartum depression. Therefore, WHO recommends that there should be region wise studies done to tailor the best management that suits the local people. Mild iron deficiency anemia is first treated with oral iron preparation. But in moderate and severe anemia, oral therapy takes a long time for improvement in hemoglobin.

Hence parenteral iron preparations are used especially towards term. Various parenteral iron preparations are available in the market which can be given either intravenously or intramuscularly. Initially, iron dextran and iron sorbitol citrate was started. But test dose was required to be given before these injections as severe anaphylactic reactions were reported with intravenous iron dextran. Iron sucrose has been reported to be safe and effective during pregnancy (3). The injection can be given without test dose (4).

AIM AND OBJECTIVE:

To assess the effect of Iron sucrose infusion in the improvement of hemoglobin level in pregnant women in a field practice area of rural Block PHC- Chunampet, Tamilnadu

MATERIALS AND METHODS:

Type of study:

It was a record-based cross-sectional study.

Study setting:

The field practice area of Government Block Rural PHC-Chunampet, Tamilnadu

Study population:

Pregnant women in field practice of Government Block Rural PHC-Chunampet, Tamilnadu

Study procedure:

Government Block Rural PHC-Chunampet is the only Government health facility in that area, surrounding 15 km. They are conducting Weekly ANC clinic, NCD clinic, Immunization clinic, Well baby clinic. In Government Block Rural PHC-Chunampet, they are regularly monitoring haemoglobin level to rule out anaemia and providing iron sucrose infusion depending upon the hemoglobin level for improvement of anaemia. We have reviewed the data from January-2021 to December-2021. All Pregnant women who visited Government Block Rural PHC-Chunampet during the study period, (from January-2021 to December-2021) were included in the study. We collected sociodemographic data (age), period of gestation, number of iron sucrose infusion, hemoglobin level before and after infusion of iron sucrose from the database. We entered the data in excel sheet and analyzed using SPSS version 21.0. Proportion and percentage were used to describe the demographic data and gestation Vs HB level, Age Vs Hb level, number of iron sucrose doses Vs increase in Hb was assessed by using chi-square test. Hb level before and after intervention was analysed by MacNemar test.

RESULT:

Out of the 143 study participants, 58 (40.6%) participants were primigravida (G-1) and 63 (44.1%) participants were Gravida 2 (G-2) (Table-1). Among the 143 study participants, 67 (47.9%) participants belonged to the age group 21-25 years and 52 participants (36.4%) belonged to the age group 26 - 30 years (Table-2). Out of the 143 participants, 106 participants (74.1%) were between 13-28 gestational weeks (Table-3). Among the total participants, most 115 participants (80.4%) received 4 doses of Iron sucrose (Table-4). Out of the 143 total study participants, 12 participants (8.4%) were referred to higher centers for blood transfusion (Table-5). Before Iron sucrose Intervention, 138 participants (96.5%) out of the total 143 study participants were found to have hemoglobin levels (Hb) <10 g/dL whereas 5 participants (3.5%) had Hb levels between 10 and 11 g/dL (Table-6). After Iron sucrose Intervention, 2 participants (1.4%) were found to have Hb levels >11 g/dL, 53 participants (37.1%) had Hb levels between 10-11 g/dL and only 88 participants (61.5%) had Hb levels <10 g/dL (Table-7). Among the 106 participants between 13-28 weeks of gestation, 104 participants (98.1%) had Hb levels <10 g/dL and 2 participants (1.9%) had Hb levels between 10-11 g/dL before Iron sucrose Intervention (Table-8). After Iron sucrose Intervention, 1 participant (0.9%) was found to have Hb levels > 11 g/dL, 38 participants (35.9%) had Hb levels between 10-11 g/dL and only 67 (63.2%) had Hb levels < 10 g/dL (Table-9). Among the 58 participants who were Primigravida (G-1), 56 participants (96.6%) were found to have Hb levels < 10 g/dL and 2 participants (3.4%) were found to have Hb levels between 10-11 g/dL before Iron sucrose Intervention (Table-10). After Iron sucrose Intervention, 24 participants (41.4%) were found to have Hb levels between 10-11 g/dL and only 34 participants (58.6%) were found to have Hb levels <10 g/dL in Gravida-1 (Table-11). Among 63 study participants who were Gravida 2 (G-2), 61 participants (96.8%) were found to have Hb levels <10 g/dL and 2 participants (3.2%) were found to have Hb levels between 10 and 11 g/dL (Table-10). After Iron sucrose Intervention, 2 participants (3.2%) were found to have Hb levels >11 g/dL, 23 participants (36.5%) had Hb levels between 10 and 11 g/dL and only 38 participants (60.3%) were found to have Hb levels <10 g/dL (Table-11). Before Iron sucrose Intervention, the mean Hb level was 9.023 (± 0.77). After Iron sucrose Intervention, the mean Hb level was 9.755 (± 0.79) (Table 12).

Table-1: Distribution of Gravida among study participants (n=143)

Gravida	Frequency (%)
G-1	58 (40.6%)
G-2	63 (44.1%)
G-3	21 (14.7%)
G-4	1 (0.6%)

Table-2: Distribution of Age among study participants (n=143)

Age distribution	Frequency (%)
<20 years	16 (11.2%)
21-35 years	67 (47.9%)
26-30 years	52 (36.4%)
31-35 years	5 (3.5%)
>35 years	3 (2.1%)

Table-3: Distribution of Gestational weeks among study participants (n=143)

Gestational Weeks	Frequency (%)
0-12 weeks	2 (1.4%)
13-28 weeks	106 (74.1%)
29-40 weeks	35 (24.5%)

Table-4: Distribution of number of iron sucrose doses (n=143)

Number of doses	Frequency (%)
1	3 (2.1%)
2	6 (4.2%)
3	3 (2.1%)
4	115 (80.4%)
5	3 (2.1%)
6	13 (9.1%)
Total	143 (100%)

Table-5: Distribution of number of participants referred for blood transfusion (n=143)

Referral for blood transfusion	Frequency (%)
No	131 (91.6%)
Yes	12 (8.4%)
Total	143 (100%)

Table-6: Distribution of haemoglobin level before intervention (n=143)

Haemoglobin level	Frequency	Percent (%)
<10	138	96.5
10-11	5	3.5
Total	143	100.0

Table-7: Distribution of haemoglobin level after intervention (n=143)

Haemoglobin level	Frequency	Percent
<10	88	61.5
10-11	53	37.1
>11	2	1.4
Total	143	100.0

Table-8: Association between Gestational weeks and haemoglobin level before iron sucrose infusion (n=143)

Gestational weeks	Hb level before intervention		Total
	<10	10-11	
0-12	2	0	2
	100.00%	0.00%	100.00%
13-28	104	2	106
	98.10%	1.90%	100.00%
29-40	32	3	35
	91.40%	8.60%	100.00%
Total	138	5	143
	96.50%	3.50%	100.00%

Table-9: Association between Gestational weeks and haemoglobin level after iron sucrose infusion (n=143)

Gestational weeks	Hb level after intervention			Total
	<10	10-11	>11	
0-12	2	0	0	2
	100.00%	0.00%	0.00%	100.00%
13-28	67	38	1	106
	63.20%	35.9%	0.90%	100.00%
29-40	19	15	1	35
	54.30%	42.8%	2.90%	100.00%
TOTAL	88	53	2	143
	61.50%	37.1%	1.40%	100.00%

Table-10: Association between Gravida and haemoglobin level before iron sucrose infusion (n=143)

Gravida	Hb level before intervention		Total
	<10	10-11	
G1	56	2	58
	96.60%	3.40%	100.00%
G2	61	2	63
	96.80%	3.20%	100.00%
G3	20	1	21
	95.20%	4.80%	100.00%
G4	1	0	1
	100.00%	0.00%	100.00%

TOTAL	138	5	143
	96.50%	3.50%	100.00%

Table-11: Association between Gravida and haemoglobin level after iron sucrose infusion (n=143)

Gravida	Hb level after intervention			Total
	<10	10-11	>11	
G1	34 58.60%	24 41.4%	0 0.00%	58 100.00%
G2	38 60.30%	23 36.5%	2 3.20%	63 100.00%
G3	15 71.40%	6 28.6%	0 0.00%	21 100.00%
G4	1 100.00%	0 0.00%	0 0.00%	1 100.00%
TOTAL	88 61.50%	53 38.5%	2 1.40%	143 100.00%

Table-12: Mean haemoglobin level before and after iron sucrose intervention

Iron-sucrose intervention	Mean	Standard deviation (+)
Before intervention	9.023	0.77
After intervention	9.755	0.79

DISCUSSION:

The effect of iron sucrose infusion in the improvement of haemoglobin in pregnant women in a field practice area of rural block PHC-Chunampet, Tamil nadu was assessed and the mean Hb was found to have increased from 9.023($\pm$ 0.77) g/dl before intervention to 9.755($\pm$ 0.79) g/dl after intervention with a mean difference of 0.732 g/dl. This is comparable with a study conducted by *Kaur et al* which concluded that mean Hb level increased from 8.5($\pm$ 0.88)g/dl before intervention to 10.3($\pm$ 1.24)g/dl with a mean difference of 1.7g/dl (5). Another study conducted by *C Giannoulis et al* showed an increase in Hb level of 4.6g/dl. This difference in increase could be due to baseline Hb levels, disparity in varying number of doses of iron sucrose injections and study setting of *Kaur et al* which was at a secondary care hospital and *C Giannoulis et al* which was at a tertiary care hospital in contrast to our study in rural PHC (6).

Overall 1.4% of women had normal haemoglobin at the time of endline. *Halder et al* concluded that 15.33% of women had normal haemoglobin at the end of study timeline (7).

In the second trimester (gestational age of 13-28 weeks), there were 98.10% women having Hb level less than 10g/dl before intervention that reduced to 63.20% women with Hb level less than 10g/dl after intervention. In the third trimester, there is a decrease of 37.1% in the number of women with Hb level less than 10g/dl from 91.4% to 54.3% after intervention.

CONCLUSION:

The study has shown that iron sucrose injection has been effective in increasing the Hb levels in all gestational ages of pregnancy. The intervention proved to be most effective in primi gravida women, reducing the number of women with Hb less than 10g/dl by 37.1% from 96.6% to 58.6% after administration of iron sucrose.

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