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Comparitive Study of Intravenous Iron Sucrose and Oral Iron Therapy in Iron Deficiency Anemia during Pregnancy- At Tertiary Care Hospital

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KEYWORDS
Iron sucrose, Pregnancy, Iron deficiency anemia.

ABSTRACT:

Background: Despite being preventable and treated, iron deficiency anemia is still a major problem in obstetrics worldwide. The research aimed to determine whether intravenous iron sucrose was safer and more effective than oral iron in treating iron-deficient anemia in pregnant women.

Materials and methods: In this randomized controlled research, 166 pregnant women were enrolled. Their gestational ages ranged from 24 to 37 weeks, and their hemoglobin levels were between 7-9.9 gm/dl and serum ferritin levels were less than 15 ng/ml. The study's main goal was to raise the hemoglobin levels of pregnant women to a target of 11.0 g/dL. The selected patients were split into two groups, with Group A being administered IV iron sucrose. The intravenous group received 200 mg of iron sucrose mixed with 100 ml of normal saline every other day until the required dosage was reached. Ferrous ascorbate, which contains 100 mg of elemental iron, was given to individuals in Group B twice daily along with 1.1 mg of folic acid. Blood iron and hemoglobin levels were measured at three and six weeks to determine the treatment's effectiveness. Adverse effects were tracked in both sets of participants. After collecting the necessary information, it was tabulated and analyzed statistically.

Results: A rise in hemoglobin and serum ferritin concentrations was observed from 8.6±0.6 to 10.9±0.6g/dl and 31.9±6.5 to 86.9±7.5ng/ml in Group A and from 9.1±0.7 to 10.4±0.7g/dl and 35.6±7.1 to 70.1±76.8 in Group B after six weeks. At the time of delivery, 50.6% of the subjects in the IV group achieved hemoglobin levels above 11 g/dL, compared to only 21.7% in the oral group. The intravenous group showed a higher increase in Hb and ferritin levels compared to the oral group. Serious adverse medication reactions were not reported in the intravenous iron group, while gastrointestinal symptoms were the most common adverse event reported in the oral iron group.

Conclusion: This study demonstrates the effectiveness of intravenous iron therapy for pregnant women diagnosed with anemia in late gestation. Intravenous iron sucrose was found to be well-tolerated during pregnancy.

Introduction

Anemia is the most prevalent medical issue among pregnant women, with its incidence, etiology, and severity differing across various ethnicities (1). Iron deficiency anemia is the most prevalent nutritional problem and the leading cause of anemia globally. It is a disorder caused by a deficiency of healthy red blood

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cells. Erythrocytes are generated in the bone marrow and possess a lifetime of around 120 days. The human body requires iron, vitamin B12, and folic acid for the production of red blood cells, a process termed erythropoiesis. Anemia may develop due to inadequate nutritional availability or excessive loss of red blood cells (3-5). Anemia in pregnancy is defined by hemoglobin concentrations. The World Health Organization (WHO) characterizes anemia as a hemoglobin concentration below 11 g/dL in general, and for pregnant women, below 10 g/dL in the first trimester, below 10.5 g/dL in the second trimester, and below 11 g/dL in the third trimester, acknowledging the peak physiological dilution of blood during the second trimester. This happens due to a 50% increase in plasma volume, which is disproportionate to the concurrent 25% growth in red cell mass. Anemia impedes oxygen transfer via the placenta to the fetus, obstructing normal intrauterine development and leading to fetal demise and neonatal death. It also elevates the risk of maternal problems, including preterm labor, placental abruption, severe postpartum hemorrhage, preeclampsia, hysterectomy, maternal shock, increased hospitalizations to critical care units, and perhaps maternal mortality. Furthermore, the fetus encounters dangers such as low birth weight, small size for gestational age, fetal discomfort, preterm delivery, memory and processing difficulties, intellectual impairment, and iron deficiency (7).

A significant percentage of pregnant women in India experience iron deficiency anemia (IDA), which is a critical public health concern. The National Family Health Survey-3 (NFHS) indicates that 57.9% of pregnant women across the country experience iron deficiency anemia (IDA). The regional breakdown of this data is particularly alarming, since rural regions have a little higher prevalence of IDA at 59%, in contrast to 54.6% in urban areas. Nonetheless, it is crucial to acknowledge that the incidence of IDA significantly differs among various states in India, underscoring the necessity for targeted treatments and a sophisticated strategy to tackle this health issue (2)(3). Data reported by the WHO at the 2003 FIGO meeting indicates that around 500,000 maternal fatalities and 20 million instances of maternal illness per year are attributable to iron deficiency anemia (IDA). A FOGSI-WHO research on maternal morbidity in India has demonstrated a significant correlation between iron deficiency anemia (IDA) and maternal mortality, with 64.4% of dead women exhibiting hemoglobin levels below 8 gm% and 21.6% presenting values as low as 5 gm%. These findings underscore the pressing need for effective methods to prevent and manage iron deficiency anemia in pregnant women, intending to improve mother and child health outcomes (2). The primary treatment for iron deficiency anemia consists of administering oral iron supplements. It is cheap, readily available, and effective (8). Oral iron employs the body's inherent processes to elevate hemoglobin levels, requiring around 4 to 6 weeks to boost hemoglobin and an additional 2 to 3 months to restore iron reserves. Consequently, numerous individuals have difficulties in maintaining continuous oral iron supplementation (1). The Indian market provides an extensive range of oral iron supplements, including ferrous sulfate, ferrous fumarate, ferrous succinate, ferrous gluconate, ferrous polymaltose, and carbonyl iron. Moreover, parenteral alternatives exist, such as iron dextran, iron gluconate, iron sorbitol citric acid, and iron hydroxide-sucrose (9). Ferrous ascorbate soluble complex aids in counteracting the inhibitory effects of iron absorption inhibitors, which are more common in the alkaline pH of the upper intestine. Ferrous ascorbate exhibits substantial bioavailability, between 26.4% and 50.4%, signifying that a considerable fraction of the consumed iron is efficiently absorbed. Furthermore, it serves as a powerful antioxidant, offering further advantages for general health (6). Parenteral iron is advised in cases of intolerance to oral iron adverse effects, gastric ulcers, and non-compliance with oral regimens (10). Parenteral iron treatment is often equally efficacious as oral iron in promoting erythropoiesis. It guarantees comprehensive iron distribution, restores iron reserves, and resolves compliance challenges. Nonetheless, intramuscular iron administration may be linked to discomfort, dermal discoloration, erratic delivery, and absorption complications. Older iron formulations, such as iron dextran, provide a risk of allergic responses and even lethal anaphylaxis. Iron sucrose, first on the European market in 1950, has demonstrated a reliable safety profile. Iron sucrose is efficiently used by the bone marrow for erythropoiesis and by the reticuloendothelial system for iron sequestration. A significant benefit of iron sucrose over iron dextrans is that it eliminates the requirement for a

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test dosage during the initial delivery (11). This study aimed to provide a comprehensive knowledge of the problem by comparing the effectiveness and safety of oral iron formulations with intravenous iron sucrose in pregnant women between 24 and 37 weeks of gestation.

Materials and methods

Study design: A prospective observational study was conducted at the Department of Obstetrics & Gynecology, from March to August 2024, after obtaining approval from the Institutional Ethics Committee with Ref: EC/NEW/INST/2023/TE/0235.

Sample size: This study was done on 166 patients for 6 months.

Inclusion criteria: Pregnant women aged 18-45 years with singleton or multiple pregnancies between 24 and 37 weeks gestation, diagnosed with mild to moderate iron deficiency anemia (hemoglobin 7-10 g/dL, serum ferritin <15 ng/mL), and who provided informed consent were enrolled in the study.

Exclusion criteria: Pregnant women with gestational ages less than 24 weeks or over 37 weeks, aged under 18 or over 45 years, with a history of bleeding tendencies, blood transfusions within the past 120 days, hemoglobinopathies, red cell disorders, allergic conditions, asthma, acute inflammatory states, or other atopic diseases, anemia due to causes other than iron deficiency anemia (e.g., sickle cell anemia, hemochromatosis, hemosiderosis, thalassemia), or those unwilling to participate were excluded from the study. Assessments of hemoglobin concentration and serum ferritin levels in the 3rd and 6th weeks served as the principal end measures.

Methodology:

Random assignment was used to divide patients who met the inclusion criteria into two groups: Group A (intravenous, n=83) and Group B (oral, n=83).

Group A: In the first group, the women who were given iron sucrose intravenously got the following dosage calculated as follows: Body weight (kg) × (target hemoglobin - initial hemoglobin) gm/dL × 2.4 + 500 mg

Each dose was calculated by rounding to the nearest 100 milligrams. We added 500 mg to replenish iron stores and set a target hemoglobin level of 11 g/dL. According to the French Drug Agency's recommendation, patients were given 200 mg split dosages every other day, with a weekly maximum of 600 mg. The medicine administration process necessitated the patient's brief hospital stay. As the pre-pregnancy weight was unavailable, the weight recorded during the first visit was used. Studies have shown that iron sucrose is stable in normal saline at concentrations of 0.5 to 2 mg/mL for up to 24 hours. A maximum of 200 mg of elemental iron was administered per infusion, diluted in 100 mL of normal saline, and infused on alternate days. Each 2.5 mL ampoule contained 50 mg of elemental iron, and the ampoules were diluted with normal saline immediately before infusion (5). The prescribed dosage was administered, and the treatment was considered complete. Throughout the trial, no extra iron was given to the participants. All necessary measures were implemented to address the possibility of anaphylactic reactions.

Group B: Participants in the oral group were instructed to take two tablets daily throughout pregnancy. Each tablet contained 100 mg of elemental iron in the form of ferrous ascorbate and 1.1 mg of folic acid. The recommended time to take the pills was two hours before or after a meal when the stomach was empty. On a given calendar, patients were told to record the days that they took their prescriptions as prescribed. Compliance was monitored by collecting empty blister packs and enquiring about stool color at each antenatal visit. In both groups, every possible adverse impact, no matter how little, was documented (2).

Patient counseling was given for both groups to improve the patients' understanding of iron deficiency anemia, its complications, and strategies to overcome it by following a proper diet and adhering to the medication.

From their first visit to the maternity clinic until the day of delivery, every woman was frequently monitored. By comparing the changes in hemoglobin and serum ferritin levels at the 3rd and 6th weeks to the baseline values, the improvement rate in both groups was evaluated. Furthermore, in every case, the records included the gestational age at delivery, parity, gravidity, and the birth weights of the infants.

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STATISTICAL ANALYSIS:

Data was inputted into a predefined proforma. The entire dataset is represented using descriptive statistics: mean, median, standard error, and standard deviation. For quantitative data, the difference between means was determined using the Student's unpaired t-test. For qualitative data, the Chi-square test was utilized as appropriate. A p-value of less than 0.05 was considered statistically significant at an alpha level of 0.05. The software packages used for data analysis in this study were MS-Excel 2019, SPSS 16, Openepi 3.01, and Jamovi 2.3.21.

RESULTS

In this prospective study, 166 pregnant women met the inclusion criteria and were randomly allocated to one of two groups: iron sucrose (Group A, n=83) or ferrous ascorbate (Group B, n=83). There were no dropouts or exclusions. The majority of participants (43%) were aged between 21 and 25 years, with 62% being multigravidas and 37% primigravidas. Non-vegetarians represented 68.7% of the cohort. Regarding the inter-conceptional period, 30% had less than 24 months, while 36% exceeded 24 months. Vegetarians accounted for 66% of the participants. Before pregnancy, 74% experienced heavy menstrual flow, 6% had a normal flow, and 20% had hypomenorrhea. The mean Body Mass Index (BMI) was comparable between groups, averaging around 27. The mean gestational age at anemia diagnosis was 28.1 weeks for the IV group and 27.6 weeks for the oral group. The IV group had a slightly higher mean gestational age at delivery (38.3 weeks) compared to the oral group (37.1 weeks). Within the IV group, 36 patients (21.6%) required four 200 mg doses of iron sucrose in 100 ml of normal saline, while 30 patients (18%) and 16 patients required three doses based on individual needs. The proportion of patients reaching the target hemoglobin level was 50.6% in Group A and 21.7% in Group B. Adherence was high in the oral group, with 80% fully utilizing the provided ferrous ascorbate foils. Iron Deficiency Anemia (IDA) was present before pregnancy in 22.28% of the women, whereas 77% developed IDA during pregnancy.

TABLE 1: Differences in mean parameters between GROUP A and GROUP B:

RESULTS	I.V.(N=83)	ORAL(N=83)	TOTAL (N=166)	P VALUE
HB-B4-TRMT				<0.001[1]
Mean ± SD	8.6 ± 0.6	9.1 ± 0.7	8.9 ± 0.7	
Range	7.0-9.8	6.9-10.8	6.9-10.8	
HB-3W				0.991[1]
Mean ± SD	9.8 ± 0.6	9.8 ± 0.7	9.8± 0.7	
Range	8.0-10.8	7.9-11.4	7.9-11.4	
HB-6W				<0.001[1]
Mean ± SD	10.9 ± 0.6	10.4 ± 0.7	10.6 ± 0.7	
Range	8.6-11.8	8.7-11.8	8.6-11.8	
HB-DELV				<0.001[1]
Mean ± SD	11.8 ± 0.6	10.9 ± 0.7	11.3 ± 0.8	
Range	9.2-12.8	93-12.2	9.2-12.8	
SF-B4-TRMT				<0.001[1]
Mean ± SD	31.9 ± 6.5	35.6 ± 7.1	33.7 ± 7.0	
Range	20.0-48.0	20.0-47.0	20.0-48.0	
SF-3W				<0.001[1]
Mean ± SD	52.6 ± 7.3	47.1 ± 7.4	49.9 ± 7.8	
Range	37.0-68.0	31.0-60.0	31.0-68.0	
SF-6W				0.048[1]
Mean ± SD	86.9 ±7.5	70.1 ± 76.8	78.5 ± 55.0	
Range	72.0-112.0	51.0-760.0	51.0-760.0	

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Table 1: HB-B4-TRMT or HB(Baseline): Haemoglobin before treatment, HB-3W: Haemoglobin at the third week, HB-6W: Haemoglobin at sixth week, HB-DELV: Haemoglobin at delivery, SF-B4-TRMT or SF(Baseline): Serum ferritin before treatment, SF-3W: Serum ferritin at the third week, SF-6W: Serum ferritin at sixth week, HB-AT TERM: Haemoglobin at term.

Table 1 illustrates the mean hemoglobin and serum ferritin levels at each follow-up interval: before treatment, 3 weeks post-treatment, and 6 weeks post-treatment. Notably, there is a significant increase in both mean hemoglobin and serum ferritin levels post-treatment compared to pre-treatment values. The Linear Model one-way ANOVA demonstrates significant differences ($P<0.05$) in mean parameters between the groups, signifying a statistically significant difference between GROUP A (intravenous group) and GROUP B (oral group), except HB-3W. These results indicate that intravenous iron supplementation may be a superior and more efficacious method for patients in need of rapid iron replenishment, particularly in instances of severe iron deficiency.

Table 2: Haemoglobin and Serum ferritin difference from baseline or [B4-Treatment] between GROUP A and GROUP B

	GROUP	N	MEAN	SD	MEDIAN	SE	P-VALUE
(HB-3W)-HB(BASELINE)	**IV** **ORAL**	**83** **83**	**1.13** **0.68**	**0.23** **0.20**	**1.0** **0.6**	**0.025** **0.022**	**<0.05**
(HB-6W)-HB(BASELINE)	**IV** **ORAL**	**83** **83**	**2.24** **1.28**	**0.38** **0.57**	**2.3** **1.2**	**0.042** **0.063**	**<0.05**
(HB-ATTERM)-HB(BASELINE)	**IV** **ORAL**	**83** **83**	**3.12** **1.82**	**0.43** **0.35**	**3.0** **1.8**	**0.047** **0.038**	**<0.05**
(SF-3W)-SF(BASELINE)	**IV** **ORAL**	**83** **83**	**20.7** **11.6**	**4.64** **2.79**	**20.0** **11.0**	**0.5** **0.3**	**<0.05**
(SF-6W) SF(BASELINE)	**IV** **ORAL**	**83** **83**	**55.0** **34.5**	**6.27** **76.8**	**55.0** **25.0**	**0.6** **8.4**	**<0.05**

The change in hemoglobin values from baseline in the intravenous group was 1.13 ± 0.23 at 3 weeks, 2.24 ± 0.38 at 6 weeks, and 3.12 ± 0.43 at term, compared to the oral iron group, which showed 0.68 ± 0.20 at 3 weeks, 1.28 ± 0.57 at 6 weeks, and 1.82 ± 0.35 at term. The Independent Samples T-test, used to assess the differences in Hemoglobin and Serum ferritin from baseline, indicated a P-value <0.05, which was clinically significant. This demonstrated that hemoglobin levels increased more significantly in the intravenous group. Furthermore, as shown in Table 2, serum ferritin levels increased significantly in both groups from baseline to 6 weeks, although the intravenous group showed a larger increase at each measurement point ($P<0.005$).

Table 3: Side effects between study Group A and Group B

S No	COMPLAINTS-TRMT-GROUP A-B	GROUP (A) I.V. (N=83)	GROUP (B) ORAL. (N=83)
1	PAIN AT THE SITE OF INJECTION	3	-
2	REDNESS & SWELLING AT THE SITE OF INJECTION	1	-
3	FEVER	0	1
4	NAUSEA	1	8
5	DIARRHEA	0	2
6	CONSTIPATION	0	2
7	METALLIC TASTE	0	1
8	MYALGIA	0	1

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9	VOMITING	1	3
10	EPIGASTRIC DISCOMFORT	0	1
11	OTHERS	0	1

Table 3 represents the side effects observed between study groups. The oral group reported more side effects compared to the IV group. The highest number of patients, 8%, complained of nausea in the oral group. Additionally, 3% reported vomiting, and 2% each reported diarrhoea and constipation. In contrast, the IV group had no major side effects, and the incidence of minor side effects was 3%, with pain at the injection site being the most common. A smaller percentage reported redness and swelling at the injection site (1%), nausea (1%), and vomiting (1%).

Table 4 Comparison of gravida and parity between GROUP A and GROUP B.

	I.V.(N=83)	ORAL(N=83)	TOTAL(N=83)	P VALUE
Gravida				
1	37.0(44.6%)	25.0(30.1%)	62.0(37.3%)	
2	26.0(31.3%)	30.0(36.1%)	56.0(33.7%)	
3	17.0(20.5%)	18.0(21.7%)	35.0(21.1%)	0.141[1]
4	3.0 (3.6%)	8.0 (9.6%)	11.0(6.6%)	
5	0.0 (0.0%)	2.0 (2.4%)	2.0(1.2%)	
Parity				
1	68.0(81.9%)	61.0(73.5%)	129.0(77.7%)	
2	13.0(15.7%)	19.0(22.9%)	32.0(19.3%)	0.474[1]
3	2.0(2.4%)	2.0(2.4%)	4.0(2.4%)	
4	0.0(0.0%)	1.0(1.2%)	1.0(0.6%)	
Primigravida				
No	46.0(55.4%)	58.0(69.9%)	104.0(62.7%)	0.054[1]
Yes	37.0(44.6%)	25.0(30.1%)	62.0(37.3%)	

The above table presents a comparison of gravidity (number of pregnancies) and parity (number of live births) between GROUP A and GROUP B (IV and oral). The data shows that both groups had a similar distribution of gravidity, with the majority of women having 3 or fewer pregnancies. However, there was a significant difference in parity between GROUP A and GROUP B. The IV group had a higher proportion of women with 1 or 2 live births compared to the GROUP B (oral group), suggesting that the GROUP A (IV) intervention may have been associated with higher fertility rates. The Pearson's chi-square test for gravidity and parity distribution in the two groups is significant ($p < 0.05$), indicating a statistically significant association between the intravenous and oral groups.

Table 5 Comparision of the weight of Newborns between study groups

GROUP	<2 (N=36)	>2 (N=130)	TOTAL (N=166)	P VALUE
I.V.	9.0(25.0%)	74.0(56.9%)	83.0(50.0%)	<0.001
ORAL	27.0(75.0%)	56.0(43.1%)	83.0(50.0%)	<0.001

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Table 5 represents the comparative analyses to explore associations between newborn parameters and maternal iron deficiency between intravenous (IV) and oral iron interventions. The majority of newborns in both groups weighed more than 2 kg (50%). However, a significant difference emerged in the distribution of newborns with a birth weight of less than 2 kg. The IV group exhibited a lower proportion of newborns with a birth weight below 2 kg (25%) compared to the oral group (75%).

DISCUSSION

Because of the gravity of its effects, iron deficiency anemia warrants special study as a pregnancy-related medical concern in underdeveloped nations. This study indicated that parenteral iron sucrose is more effective than oral iron supplementation for treating iron deficiency anemia during pregnancy. The elevations in hemoglobin and ferritin levels were significantly greater in the intravenous iron sucrose group compared to the oral iron group. Iron sucrose, sanctioned for utilization in 54 nations, is a recognized hematinic treatment for diverse pregnancy-related and post-surgical illnesses (13). Research by Al Momen et al. assessed the efficacy of two therapies for iron-deficient anemia during pregnancy: intravenous iron sucrose and oral iron sulphate. A total of 59 women got 300 mg of iron sulphate orally every day, whereas 52 women administered iron sucrose intravenously. In the group given intravenous iron sucrose, the average hemoglobin level rose to 128.5 ± 6.6 g/L, while in the group given oral iron sulphate, it was 111.4 ± 12.4 g/L ($P < 0.001$) (14).In comparison to the oral iron group, which took 14.9 ± 3.1 weeks to reach the raised hemoglobin level, the group given intravenous iron sucrose achieved it in a far shorter period of 6.9 ± 1.8 weeks ($P < 0.001$). Researchers determined that iron deficiency anemia during pregnancy may be efficiently and safely treated with intravenous iron sucrose (15,16). The results of this study are in keeping with our findings, revealing that intravenous iron administration creates considerably larger hemoglobin concentrations in a lot shorter time than oral iron supplementation. Research by Al RA et al. examined the efficacy of iron sucrose injections compared to oral administration of iron poly maltose complex (300 mg elemental iron daily) in elevating hemoglobin levels. (17) At every point of testing, the study indicated that the intravenous group had a considerably greater baseline rise in hemoglobin levels compared to the oral group. This gap was most noticeable on the 14th and 28th days, with P-values of 0.004 and 0.031, respectively. Moreover, substantial changes in serum ferritin levels were noted over time in both the oral and intravenous groups ($P < 0.05$ for both). Both groups showed substantial increases in hemoglobin and ferritin levels; however, the intravenous group consistently displayed elevated serum ferritin levels relative to the oral group at every test interval. A statistically significant elevation in ferritin and hemoglobin levels was seen in the intravenous group, corroborating our findings (18). Bencaivo et al. examined the efficacy and safety of intravenous iron sucrose and oral ferrous sulfate in their investigation. The intravenous group exhibited considerably superior iron storage replenishment compared to the oral group, despite no notable increase in hemoglobin levels. This contradicts our findings, which indicated that the intravenous group exhibited significantly elevated levels of hemoglobin and ferritin (19). Ferrous sucrose is an efficacious remedy for iron deficiency anemia, attributed to its rapid absorption and use in erythropoiesis (20). Following intravenous delivery, plasma concentrations of ferrous sucrose reach their zenith within 10 minutes and diminish to undetectable levels within 24 hours, signifying rapid integration into the bone marrow. Positron emission tomography studies have validated this fast absorption, indicating that 70–97% of given ferrous sucrose is utilized for erythropoiesis, with just 4–6% excreted from the body. The efficacy of ferrous sucrose in safely replenishing iron stores and elevating hemoglobin levels has significant implications for renal patients experiencing severe iron deficiency anemia. The research indicated that intravenous ferrous sucrose was predominantly well-tolerated and did not lead to any significant side effects. Nevertheless, four individuals reported minor discomfort at the injection site, characterized by pain, erythema, and edema. The symptoms were mitigated by elevating the limb, using chromophobe ointment and an ice pack, and injecting 5 ccs of normal saline or distilled water at the infusion site following intravenous ferrous sucrose delivery. These findings align with those documented in various studies, including that of Vidya A et al., as well as larger investigations examining the safety profile of intravenous ferrous sucrose during pregnancy and the postpartum period, akin to extensive studies assessing

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the safety of intravenous ferrous sucrose during and after pregnancy (2,21). Our investigation reveals p-values of p = 0.141 for gravidity and p = 0.474 for parity, indicating no significant difference between the intravenous and oral groups. The research conducted by Georgy J et al. is devoid of p-values, hence constraining statistical comparisons. Both groups demonstrate similar patterns, with no substantial variations in gravidity and parity between the oral and intravenous (IV) groups (22). This enhances the generalizability of the findings, while larger research may provide deeper insights. Our investigation reveals a substantial disparity in gestational age and birth weight between the two cohorts. The results align with those documented by Mohammad I H et al. and Bayoumeu F et al., who noted increased birth weight in the intravenous iron cohort (1)(23)(24). Nonetheless, Khalafallah et al. observed no significant disparity in birth weight between the intravenous (IV) iron group and the oral iron group, despite utilizing iron polymaltose rather than iron sucrose (25,26). Significantly, no major adverse effects were identified in the intravenous iron cohort, but some gastrointestinal side effects were noted in the oral cohort. This research also analyzes the number of patients obtaining a target hemoglobin level (Hb > 11) after receiving intravenous (IV) and oral iron therapy. The findings demonstrate a greater percentage of patients reaching the target Hb level with intravenous treatment than with oral treatment throughout the study period, aligning with previous research (27). On days 8, 15, 21, 30, and delivery, a comparison of the oral and IV groups for hemoglobin increase was not statistically different (Bayoumeu et al., 24). This discrepancy may be ascribed to their administration of the total iron sucrose dosage over 21 days, in contrast to a mean of 8.7 days in our study. An extended treatment time may be required to attain the desired hemoglobin level. Moreover, the limited sample size in their study may have amplified the impact of confounding variables such as dietary practices and variability in iron absorption on the outcomes (28,29). Augmented patient counseling has substantially increased drug adherence, leading to enhanced health outcomes and diminished healthcare expenses. Counselors can facilitate patients' comprehension of the significance of adhering to prescribed medications by delivering explicit instructions, addressing concerns, and providing continuous support. (30) This is vital for averting maternal and fetal problems associated with iron deficiency anemia (IDA). Our research included patient counseling for 95% of participants from both Group A and Group B. This intervention may substantially diminish the risk of adverse outcomes linked to IDA.

CONCLUSION

Iron deficiency anemia (IDA) continues to be a major global health issue, especially among pregnant women. Traditional treatments, such as oral iron supplements and blood transfusions, often encounter challenges, including poor adherence, adverse reactions, and potential risks to maternal and fetal health. Intravenous iron sucrose (ISC) has emerged as a promising therapeutic option. In this study, oral iron therapy leads to a slower rise in hemoglobin levels compared to intravenous iron sucrose therapy. After six weeks, hemoglobin levels increase by 1.28 gm/dL with oral iron and 2.24 gm/dL with iron sucrose. This accelerated increase in iron sucrose can be particularly beneficial for pregnant women diagnosed with anemia later in pregnancy, when oral iron may be less effective. This can potentially reduce the need for blood transfusions during childbirth. Iron sucrose is generally well-tolerated during pregnancy with minimal side effects, while oral iron therapy can lead to gastrointestinal issues, potentially causing non-compliance and worsening anemia. These findings support the potential of intravenous iron sucrose as a safe and effective alternative to traditional iron therapy for this vulnerable population.

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