International Research Journal of Multidisciplinary Scope (IRJMS), 2023; 4(1): 37-41

Original Article | ISSN (O): 2582-631X DOI: 10.47857/irjms.2023.v04i01.087

Comparing the Efficacy of Intermittent Versus Continuous Oral Iron Supplementation in Non–Anemic Pregnant Women Presenting for Routine Antenatal Care

Basnet P[1]*, Agrawal A[1], Thakur A[1], Yadav P[1], Shrestha R[1], Shah P[2]

[1]Department of Obstetrics and Gynaecology, BPKIHS, Dharan, Nepal. [2]Department of Cardiology, BMC, Biratnagar, Nepal. *Corresponding Author's Email: prithapep@yahoo.com

ABSTRACT

Anemia in pregnancy is a major health concern all over the world. Daily iron supplementation is used to prevent and correct iron deficiency anemia during pregnancy. Intermittent iron supplementation is proposed as an alternative to daily supplementation. This study was undertaken to compare the efficacy of Intermittent versus Continuous oral iron supplementation in non-anemic pregnant women presenting for routine antenatal care. A Prospective cross sectional study was conducted among one hundred and two non-anemic pregnant women at BP Koirala Institute of Health Sciences for one year. They were allocated alternatively to continuous oral iron and intermittent (4 days in a week) iron supplementation group. Baseline hemoglobin and serum ferritin was done and women having more than 10.5gm/dl hemoglobin were recruited in the study at 14-16 weeks period of gestation. Repeat hemoglobin and ferritin was done at 28 weeks period of gestation and hemoglobin at the time of delivery was noted. Maternal and perinatal outcome were analyzed among the two groups by appropriate statistical analysis.

The repeat hemoglobin done at 28 weeks period of gestation and at the time of delivery was comparable between the groups. Though more women in the intermittent group developed anemia in 3rd trimester (11.46%), it was not statistically significant and none of the women in either group required blood transfusion intermittent iron supplementation is a good alternative to continuous oral iron supplementation as a prophylaxis in non-anemic pregnant women with similar efficacy.

Key words: Anemia, oral iron supplementation, pregnancy.

INTRODUCTION

Anemia in pregnancy is a major health concern globally. Daily oral iron and folic acid supplementation is recommended as part of the antenatal care to reduce the risk of low birth weight, maternal anemia and iron deficiency (1). Intermittent supplementation with iron has been proposed as an alternative to daily supplementation (2). Daily oral administration of iron doses far exceed the capacity of an individual to absorb, utilize and metabolize iron safely (3). The weekly dosage schedule takes advantage of turnover time for intestinal mucosal cells in humans which is 5–6 days favoring the regulation of iron absorption and avoiding daily exposure of an iron rich environment to such cells which may cause oxidative stress (4). Anemia in pregnancy can cause many complications like preterm labour, intrauterine growth restriction, congestive cardiac failure and postpartum haemorrhage. Different preparation of oral iron are available which includes ferrous ascorbate, ferrous fumarate, ferrous polymaltose complex, ferrous sulphate and these preparation have different absorption rate hence favouring the use of one over the other. In our context the preparation with good absorption and economically cheaper was selected. This study was undertaken to explore the benefits of intermittent iron supplementation as compared to continuous iron for prevention of iron deficiency anemia in pregnancy.

(Received 04th December 2022; Accepted 25th January 2023; Published 30th January 2023)

METHODS

This Prospective cross sectional study was conducted in the Department of Obstetrics and Gynecology, BPKIHS, Dharan, Nepal over a period of one year from December 2013 to November 2014. The study population consisted of one hundred and two pregnant women allocated into two groups (intermittent vs. daily oral iron supplementation).

All pregnant women booked at our hospital at 14-16 weeks period of gestation with hemoglobin more than 10.5gm/dl were included in the study. Pregnant women with acute infection, history of chronic illness, recent blood transfusion and hemoglobinopathies, teenage pregnancy were excluded from the study. At the time of recruitment detailed history, complete physical and obstetric examination was undertaken. After baseline hemoglobin and serum ferritin level, women were allocated alternatively to oral iron supplementation either intermittently (4 days in a week) or continuously (7 days in a week). The oral iron preparation used was Capsule Ferrous Fumarate 300 mg (98.6 mg elemental iron content). Intermittent group was given Capsule Ferrous Fumarate 300 mg once daily for 4 days in a week (from Monday to Thursday) 2 hours after meal. The other group was given same dose and preparation of iron daily. Oral iron in both the groups was continued throughout pregnancy. The study was conducted after obtaining ethical clearance from the Institute Ethical Review Committee.

At every antenatal visit, iron compliance was assessed by the back-count of capsules (taken since last visit) and side-effect noted if any. Hemoglobin and serum ferritin was measured at 28 weeks and hemoglobin was again repeated at the time of delivery. Hemoglobin estimation was done by auto analyzer and Serum ferritin by electrochemilumine-scence immunoassay (ECLIA) (expressed as ng/ml). Normal range for serum ferritin was taken as 25-300 ng / ml.

All enrolled women were followed throughout pregnancy. Any antenatal complication, period of gestation at delivery, birth weight of the baby was recorded. Any adverse drug reaction or side-effect and compliance with oral iron were noted in each visit (Nausea, vomiting, constipation, epigastric discomfort, diarrhea, metallic taste).

Statics Analysis

Data was analyzed using repeated measures i.e. ANOVA, chi square test and Mann-Whitney U test wherever appropriate. SPSS version 11.5 was employed for the purpose. P value less than 0.05 was considered significant.

RESULTS

In this study, fifty-one women were analyzed in the intermittent and fifty-one in the continuous oral iron group. Both groups received Ferrous Fumarate for prophylaxis of anemia in pregnancy but differently. As seen in Table 1, both groups before starting oral iron were found to be comparable with respect to age, parity, hemoglobin and serum ferritin level at inclusion.

Table 1: Comparison of demographic characteristics in two groups (n=102)

		Continuous group (n=51)	**Intermittent group(n=51)**	**p value**
Mean age (years±SD)		25.20±3.89	27.45±4.31	0.171
Gravida	1	54%	52.9%	0.550
	2	36%	35.3%	
	≥ 3	12%	11.7%	
Hb baseline (g/dl)		11.82±1.09	12.10±1.06	0.184
Serum ferritin (ng/ml)		36.67 ±54.89	37±50.97	0.947

After the baseline hemoglobin and serum ferritin, the non-anemic pregnant women were allocated and given daily oral iron seven days in a week and the other group received oral iron supplementation four days in a week. The repeat hemoglobin done at 28 weeks period of gestation and at the time of delivery was comparable between the two groups as shown in Table 2. The repeat ferritin done at 28 week though showed a decreasing trend in both the group, it was not statistically significant (p value = 0.72)

Table 2: Trend of hemoglobin at 28 weeks and admission

	Continuous (n=51)	**Intermittent (n=51)**	**P value**
Hb at 28 weeks	11.227±1.0264	11.254±1.060	0.895
Hb at admission for delivery	11.005±0.984	11.092±0.970	0.657

Both the daily and intermittent group had comparable side effects in the form of gastrointestinal upset which was mild and relieved with taking H2 blocker. Though more women in the intermittent group developed anemia in 3rdtrimester, it was not statistically significant and none of the women in either group required blood transfusion (Table 3).

Table 3: Side effect and Anemia in 3rd trimester

	Continuous group (n=51)	**Intermittent group (n=51)**	**p value**
Side effect (gastrointestinal)	7 (13.72%)	4 (7.84%)	0.245
Anemia in 3rd trimester	3 (5.88%)	6 (11.76%)	0.412

The mean period of gestation at delivery was 38.92±1.85 week in daily oral iron group and 38.82±1.95 in the intermittent iron group which was comparable (p value= 0.796). The other obstetric outcome is described in Table 4

.

Table 4: Obstetric outcome

	Continuous group (n=51)	**Intermittent group (n=51)**	**p value**
Term	47 (50.5%)	46 (49.5%)	0.727
Preterm	4 (7.8%)	5 (9.8 %)	
Preeclampsia	4 (7.8%)	6 (11.7 %)	0.505
Small for gestational age	2 (3.9%)	2 (3.9%)	1.000

The birth weight of the babies in both the groups did not differ significantly with mean of 3.00±0.51 kg and 2.932± 0.412 kg in daily vs. intermittent iron supplementation respectively (p value <0.455). The mode of delivery among the two groups was comparable with regards to vaginal delivery, caesarean section and instrumental delivery as shown in Table 5.

Table 5: Mode of delivery

	Continuous group (n=51)	Intermittent group (n= 51)	p value
Vaginal delivery	37 (72.54%)	40 (78.43%)	0.772
Caesarean section	11 (21.56%)	9 (17.64%)	
Instrumental delivery	3 (5.88%)	2 (3.92%)	

DISCUSSION

Anemia in pregnancy is a major health concern in women of reproductive age group. This is more alarming for pregnant women of developing countries where the prevalence of anemia is still higher. The prevalence of anemia among pregnant women in Nepal is as high as 46% (5). Daily oral iron and folic acid supplementation is recommended as part of the antenatal care to reduce the risk of low birth weight, maternal anaemia and iron deficiency (1). This concept of providing daily oral iron supplementation has been challenged over the last decade due to mucosal block.

In this study we found daily versus intermittent oral iron supplementation as equally effective in preventing iron deficiency anemia in pregnancy with limited side effects. This is similar to the findings of the study conducted by Bouzari *et. al.* where he found no significant difference between the pre and post treatment hemoglobin level in the daily, three times a week and weekly iron supplementation in non-anemic pregnant women (6). Another study conducted by Mukhopadhyay *et. al.* where pregnant women were randomized to receive either daily 100 mg of elemental iron or 200 mg elemental iron weekly found no significant difference in the mean hemoglobin level between the two intervention group at the end of an average seventeen weeks of iron supplementation (7). This study is also consistent to the findings of Mukhopadhyay *et. al.* in relation to the comparable mean birth weight, period of gestation and mode of delivery between the two group. Another study done by Goonewardene *et. al.* in comparing the effectiveness of prophylactic oral iron supplements (100 mg of elemental iron) given weekly, thrice weekly and daily in preventing iron deficiency anemia in pregnancy had published result contrary to this study. He found the risk of developing anemia was significantly higher in the weekly (odds ratio18.0, 95% CI 2.8-115.5, p< 0.003) and thrice weekly (odds ratio 10.0, 95% CI 1.6-64.8, p< 0.02) groups (8). The Cochrane review on analysis of intermittent versus daily iron supplementation has stated that intermittent regimens produced similar maternal and infant outcome as daily supplementation but were associated with fewer side effects and reduced the high level of hemoglobin in mid and late pregnancy. They concluded that intermittent may be a feasible alternative to daily iron supplementation among those pregnant women who are not anemic and have adequate antenatal care (2). World health organization stated that "intermittent oral iron and folic acid supplementation with 120 mg of elemental iron and 2800 μg is recommended to improve maternal and neonatal outcome if daily iron is not acceptable due to side effects, and in populations with anemia prevalence among pregnant women of less than 20 % (9). Similar findings were noted between the pre- and post-treatment hemoglobin levels (p= 0.871) and serum ferritin levels (p= 0.741) with iron supplementation in the two groups when the maternal hemoglobin level was >11g/dL before enrollment. Thus they concluded daily or weekly iron supplementation is equally effective for healthy pregnant women without anemia (10).

CONCLUSION

Intermittent oral iron supplementation four days in a week is a good alternative to daily oral iron supplementation as a prophylaxis in non-anemic pregnant women with similar efficacy. Further large

randomized controlled trial need to be conducted before making it a universal recommendation.

ACKNOWLEDGEMENT

Nil

CONFLICT OF INTEREST

None

FUNDING

No funding sources.

REFERENCES

1. WHO. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva, World Health Organization, 2012. PMID: 23586119
2. Peña-Rosas JP, De-Regil LM, Gomez Malave H, Flores-Urrutia MC, Dowswell T. Intermittent oral iron supplementation during pregnancy. Cochrane Database Syst Rev. 2015 Oct 19;2015(10):CD009997. doi: 10.1002/14651858.CD009997.pub2.
3. Viteri FE, Berger J. Importance of pre-pregnancy and pregnancy iron status: can long-term weekly preventive iron and folic acid supplementation achieve desirable and safe status? Nutr Rev. 2005 Dec;63(12 Pt 2):S65-76. doi: 10.1301/nr.2005.dec.s65-s76.
4. Pena-Rosas JP, Nesheim MC, Garcia-Casal MN, Crompton DW, Sanjur D, Viteri FE, Frongillo EA, Lorenzana P. Intermittent iron supplementation regimens are able to maintain safe maternal hemoglobin concentrations during pregnancy in Venezuela. J Nutr. 2004 May;134(5):1099-104. doi: 10.1093/jn/134.5.1099.
5. Ministry of Health, Nepal; New ERA; ICF.2017. Nepal Demographic and Health Survey 2016. Kathmandu, Nepal: Ministry of Health, Nepal.
6. Bouzari Z, Basirat Z, Zeinal Zadeh M, Cherati SY, Ardebil MD, Mohammadnetaj M, Shahnaz B. Daily versus intermittent iron supplementation in pregnant women. BMC Research Notes. 2011, 4: 444. doi: 10.1186/1756-0500-4-444.
7. Mukhopadhyay A, Bhatla N, Kriplani A, Pandey RM, Saxena R. Daily versus intermittent iron supplementation in pregnant women : Hematological and Pregnancy outcome. J Obstet Gynaecol Res. 2004; 30(6):409-17.PMID: 15566454.
8. Goonewardene M, Liyanage C, Fernando R. Intermittent oral iron supplementation during pregnancy: Ceylon Medical Journal. 2001; 46(4):132-135. doi: 10.4038/cmj.v46i4.6440.
9. WHO, WHO recommendations on antenatal care for a positive pregnancy experienceGeneva,WorldHealthOrganization;201.http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en/
10. Agrawal SK, Jindal M. Effect of daily versus intermittent iron therapy in pregnant women: hematological and pregnancy outcome. Obs Gyne Review: Journal of Obstetric and Gynecology. 2020; 6(3): 57-66. https://doi.org/10.17511/joog.2020.i03.01