https://doi.org/10.37939/jrmc.v27i2.2210

Comparison Of The Effectiveness Of Daily Versus Weekly Oral Iron Supplementation In Preventing Anemia During Pregnancy

Maliha Sadaf[1], Khansa Iqbal[2], Saira Ahmed[3], Mehak Sehar[4], Nabeela Waheed[5]

Abstract

Objectives: To compare mean haemoglobin and hematocrit in non-pregnant females taking daily oral iron vs. weekly iron supplements in the third trimester of pregnancy.

Results: There was no statistically significant difference between the two groups in terms of haemoglobin level before taking iron therapy. Mean post-treatment haemoglobin was 13.2±0.9a/d1 in group A and 12.9±0.95 g/dl in group B (0.18), mean change of haemoglobin was 1.07±0.34 011 g/dl in group A and 0.63±0.56 g/dl in group B (0.000), mean post-treatment hematocrit was 35.857±0.87 % in group A and 32.857±0.9l % in group B (p 0.000) mean change of hematocrit was 2.942±0.59 % in group A and 1.000±0.00% in group B (p 0.000).

Conclusion: Weekly iron supplementation in non-anaemic pregnant women is as effective as daily iron supplementation in terms of improvement in haemoglobin level.

Keywords: Pregnancy, Iron supplements, Daily, Weekly, Hemoglobin, Hematocrit

[1,2] Assistant Professor, Holy Family Hospital, Rawalpindi Medical University; [3] Senior Registrar, Holy Family Hospital, Rawalpindi Medical University; [4] Ex Post Graduate Trainee, Holy Family Hospital, Rawalpindi Medical University; [5] Ex Professor Holy Family Hospital, Rawalpindi Medical University
Correspondence: Dr. Maliha Sadaf, Assistant Professor, Holy Family Hospital, Rawalpindi Medical University. **Email:** drmaliha1978@gmail.com
Cite this Article: Sadaf, M., Iqbal, K., Ahmed, S., Sehar, M., & Waheed, N. (2023). Comparison Of The Effectiveness Of Daily Versus Weekly Oral Iron Supplementation In Preventing Anemia During Pregnancy . *Journal of Rawalpindi Medical College*, *27*(2). https://doi.org/10.37939/jrmc.v27i2.2210.
Received January 18, 2023; accepted May 03, 2023; published online June 24, 2023

1. Introduction

Anaemia is a global health problem for pregnant women as 32.4 million (38.2%) pregnant women worldwide have anemia[1]. Anaemia in pregnancy is a major risk factor for maternal and perinatal mortality and low birth weight babies[2]. About 50% of the cases of anaemia are due to iron deficiency[3]. Anaemia in pregnancy is defined as haemoglobin (Hb) concentration less than 11 g/dl, and HB concentrations reduce by approximately 0.5 g/L during the second trimester of pregnancy.[4]

An imbalance of iron regulation can result in significant maternal and perinatal morbidity and mortality. Any interruption in iron regulation can result in either iron deficiency or iron overload and iron deficiency is more common among the two.[5] Daily oral iron and folic acid intake are recommended as part of antenatal care[6]. But daily iron intake is associated with multiple side effects which can affect patient compliance. Therefore, weekly oral iron therapy can be used as a substitute for a daily iron regimen. Intestinal mucosal cells are blocked by large amounts of iron with daily iron therapy which may decrease the iron absorption from the intestines.[7] Weekly iron therapy may expose the intestinal cells to iron less frequently which can improve iron absorption. Once weekly 120 mg of elemental iron and 2.8 mg folic acid is recommended for non-anemic pregnant women to prevent anemia[8] which is an alternative regimen to a daily iron dosage by WHO. Many studies carried out previously show that there is no difference in the efficacy of daily compared to weekly oral iron therapy in non-anaemic pregnant females for prevention of anaemia. A randomized controlled trial conducted in Sri Lanka showed thgroup(nausea significant difference between the groups in mean haemoglobin and hematocrit levels, pre supplementation mean haemoglobin was 11.9 in the daily and 11.8 in the weekly group ('p' 0.239), after therapy haemoglobin in daily group 11.8 and in weekly group 11.7 ('p' 0.731), mean hematocrit was 34.8 in daily and 34.4 in the weekly group (`p' 0.360) in the pre supplementation and post supplementation hematocrit was 35.2 in daily group and 35.2 in weekly group ('p' 0.913) respectively, while significantly greater side effects occurred in the daily compared to weekly group(nausea 39% in daily and 17% in weekly group ('p'<0.001))[9].

A prospective randomized longitudinal study in India showed that weekly iron supplementation is an effective option in non-anaemic pregnant women for prophylaxis of anemia[9]. A study in Iran showed that levels of haemoglobin and hematocrit and other indices do not differ significantly (`p'>0.05) in daily or intermittent oral iron therapy group[10]. Oral iron

intake once or twice a week can be used as a substitute for daily iron in pregnant women.[11]

This study aims to compare the effectiveness of weekly and daily oral iron supplementation in pregnancy.

2. Materials & Methods

This study was designed as a randomized controlled clinical trial during the period from November 2019 to May 2020. The study was conducted at Holy Family Hospital, Rawalpindi in the outpatient antenatal clinics. Seventy (70) pregnant women were randomly assigned through a computer-generated randomization sheet to receive oral iron supplementation either daily or weekly.

Inclusion and Exclusion Criteria:

All pregnant females of reproductive age (15-40 years) with singleton pregnancies, at a gestational age of 14 to 22 weeks with a haemoglobin level of 11g/dl and above were included in the study.

While females are intolerant to oral iron supplements, haematological disorders or chronic illness (for example, thalassemia, chronic renal diseases), serum ferritin less than 30µg/L were excluded from the study. Permission from the institute's ethical forum was obtained. The women were equally divided into two groups. Group A of 35 received a 200 mg ferrous sulphate tablet (65 mg elemental iron) daily while group B of 35 women received 400 mg ferrous sulphate (130 mg elemental iron) weekly. Every patient fulfilling the selection criteria was allocated a study ID number in chronological order, SSPS generated a study group corresponding to that ID number was the study group of that patient. Data was collected in the form of questionnaires after asking the patients. For serum haemoglobin and hematocrit levels, a 5 ml venous sample was taken and tests were carried out from the hospital laboratory. Haemoglobin and hematocrit levels are checked before starting iron supplementation and repeated three weeks after starting oral iron therapy. All women are advised to take 100 mg of mebendazole twice daily for 3 days for deworming before selection. All the information on patients was collected in the form of a structured questionnaire.

Statistical Analysis:

Data were analyzed using SPSS version 20 on a computer. Descriptive statistics were calculated for both qualitative and quantitative variables. For qualitative variables i.e. parity, frequency and percentages were calculated. For quantitative variables for example mean serum hemoglobin and mean hematocrit, standard deviation was calculated. Independent sample 't-test was applied at a 5% level of significance to compare mean levels of serum haemoglobin and serum hematocrit. 'p-value <0.05 was considered statistically significant. To control any potential effect, modifiers for example parity, age, and stratified analysis was done. Post-stratification independent sample t-test was applied.

3. Results

The age range in this study was from 15 to 40 years with mean baseline haemoglobin of 12.14±0.91 g/dl in group A while 12.23±0.97 g/dl in group B, mean post-treatment haemoglobin was 13.21±0.93 g/dl in group A and 12.86±0.95 g/dl in group B, mean change of haemoglobin was 1.07±0.34 g/dl in group A and 0.63±0.56 g/dl in group B, mean baseline hematocrit was 32.91±0.91 % in group A while 32.86±0.91 % in group B, mean post-treatment hematocrit was 35.86±0.87 % in group A and 32.86±0.91 % in group B, mean change of hematocrit was 2.94±0.59 % in group A and 1.000±0.00 % in group B as shown in Table-1.

Table-1 Comparison between both groups as regards demographic data and characteristics

Demographics	Mean±SD Group A (n=35)	Mean±SD Group B (n=35)	P value
Baseline haemoglobin (g/dl)	12.14±0.91	12.23±0.97	0.705
Post-treatment haemoglobin (g/dl)	13.21±0.93	12.86±0.95	0.118
Change of haemoglobin (g/dl)	1.07±0.34	0.63±0.56	0.000
Baseline hematocrit (%)	32.91±0.91	32.86±0.91	0.795
Post-treatment hematocrit (%)	35.86±0.87	33.86±0.91	0.000
Mean change of hematocrit (%)	2.94±0.59	1.00±0.00	0.000

While comparing the variables, mean baseline haemoglobin was 12.142±0.91 g/dl in group A while 12.228±0.97 g/dl in group B (p 0.705), mean post-treatment haemoglobin was 13.214±0.93 g/dl in group A and 12.857±0.95 g/dl in group B (0.118), mean change of haemoglobin was 1.071±0.34 g/dl in group A and 0.628±0.56 g/dl in group B (0.000), mean baseline hematocrit was 32.914±0.91 % in group A while

32.857±0.91 % in group B (p 0.795), mean post-treatment hematocrit was 35.857±0.87 % in group A and 32.857±0.91 % in group B (p 0.000), mean change of hematocrit was 2.942±0.59 % in group A and 1.000±0.00 % in group B (p 0.000) as shown in Table-1. Stratification of baseline haemoglobin, post-treatment haemoglobin, change of haemoglobin, baseline hematocrit, post-treatment hematocrit and mean change of hematocrit of both groups concerning age and parity are shown in Table-2, 3, 4 and 5.

Table-2 Stratification of Hemoglobin in both groups concerning parity

Parity	Group	Baseline haemoglobin (g/dl)	P-Value	Post-treatment haemoglobin	p Value	Mean change of haemoglobin (g/dl)	P Value
0-3	A (n=26)	12.192±0.98	1.000	13.211±1.02	1.0	1.019±0.29	1.0
	B (n=27)	12.033±0.93		12.703±0.89		0.666±0.62	
>3	A (n=9)	12.000±.70	<0.001	13.222±0.66	0.458	1.222±0.44	1.0
	B (n=8)	12.876±0.83		13.375±1.02		0.500±0.26	

Table-3 Stratification of Hemoglobin concerning Age in both groups

Age (Years)	Group	Baseline haemoglobin (g/dl)	P-Value	Post-treatment haemoglobin	p Value	Mean change of haemoglobin (g/dl)	p Value
15-30	A	12.190±1.03	1.000	13.214±1.04	1.0	1.023±0.29	1.0
	B	12.000±.95		12.673±0.89		0.673±0.66	
31-40	A	12.071±.73	0.003	13.214±0.77	1.0	1.142±0.41	1.0
	B	12.666±0.88		13.208±0.98		0.541±0.25	

Table-4 Stratification of Hematocrit concerning parity in both groups

Parity	Group	Baseline hematocrit (%)	P-Value	Post-treatment hematocrit (%)	p Value	Mean change of hematocrit (%)	p Value
0-3	A	33.000±0.89	1.000	35.923±0.89	1.0	2.923±0.48	1.0
	B	32.925±0.91		33.925±0.91		1.000±0.0	
>3	A	32.666±1.00	1.00	35.666±0.86	1.0	3.000±0.86	1.0
	B	32.625±0.91		33.625±0.91		1.000±0.0	

Table-5 Stratification of Hematocrit concerning age in both groups.

Age (Years)	Group	Baseline hematocrit (%)	P-Value	Post-treatment hematocrit (%)	p Value	Mean change of hematocrit (%)	p Value
15-30	A	33.047±0.86	1.000	35.952±0.86	1.0	2.904±0.53	1.0
	B	32.782±0.90		33.782±0.90		1.000±0.0	
31-40	A	32.714±0.99	0.221	35.714±0.91	1.0	3.000±0.67	1.0
	B	33.000±0.95		34.000±0.95		1.000±0.0	

5. Discussion

This study aimed to compare the haemoglobin levels in non-anaemic pregnant women receiving weekly versus daily iron supplementation. Two groups were matched and no statistically significant difference could be detected between both groups as regard maternal age, parity (demographic data); haemoglobin level and hematocrit before starting iron supplementation and after treatment which can be attributed to proper randomization. Concerning the improvement of iron status at near term in pregnancy, our study showed that supervised weekly iron supplementation did not differ in outcome from daily supplementation. Though in our study the haemoglobin rise was more significant in the daily group, it increased to a significant level in the weekly group too and was maintained at a safe level. In a study by Mumtaz *et al*[12], the haemoglobin rose to a significant level in the weekly group (p=0.0037). The serum iron values increased to a significant level in both groups but the increase in the daily group was significantly more than in the weekly group. In the

study by Khangura et al.[13], post-treatment haemoglobin and hematocrit levels increased both in the daily and intermittent supplementation groups but this rise in haemoglobin and hematocrit was more in the daily as compared to the intermittent supplementation group. They concluded that intermittent iron therapy is equally effective as daily iron therapy and is associated with less nausea. These findings are similar to our study. In another study by Chu Lam et al[14], conducted on pregnant women with mild anaemia, the increase in haemoglobin and hematocrit levels was almost the same in the daily iron group as compared to the alternate day iron group after 6 weeks of iron supplementation. This study concluded that daily and intermittent iron supplementation has no difference in the treatment of iron deficiency anaemia in pregnancy. These findings are also consistent with our study. Yaznil MR and colleagues also found in their study that there is no significant difference in mean haemoglobin and hematocrit between daily and weekly groups before and after iron supplementation.[15] Weekly iron supplementation as a prophylaxis in non-anaemic pregnant women is as good as daily supplementation as regards the increase in haemoglobin level, in addition, it was associated with significantly fewer side effects and much better compliance [16, 17, 18, 19].

5. Conclusion

According to the results of this study, iron supplementation every week as a preventative measure in non-anaemic or mildly anaemic patients is just as effective as daily supplementation in terms of improvement in haemoglobin and hematocrit levels. Weekly iron supplementation is also associated with fewer side effects and better patient compliance.

CONFLICTS OF INTEREST- None

Financial support: None to report.

Potential competing interests: None to report

Contributions:

M.S, N.W - Conception of study

M.S - Experimentation/Study conduction

M.S, K.I, S.A - Analysis/Interpretation/Discussion

M.S, S.A - Manuscript Writing

K.I, N.W - Critical Review

M.S - Facilitation and Material analysis

References

[1] World Health Organization (WHO), (2015): Hemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System . Cochrane Database Syst Rev., 10.1002/14651858.CD009997.pub2.

[2] Boschi-Pinto C, Young M, Black RE. The Child Health Epidemiology Reference Group reviews of the effectiveness of interventions to reduce maternal, neonatal and child mortality. Int J Epidemiol. 2010;39 Suppl 1(Suppl 1):i3-i6.

[3] Stevens GA, Finucane MM, De-Regil LM, Paciorek CJ, Flaxman SR, Branca F, Peña-Rosas JP, Bhutta ZA, Ezzati M, Nutrition Impact Model Study Group. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. The Lancet Global Health. 2013 Jul 1;1(1):e16-25.

[4] Benoist BD, McLean E, Egll I, Cogswell M. Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia. Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia 2008.

[5] World Health Organization. Guideline: daily iron and folic acid supplementation in pregnant women. World Health Organization; 2012.

[6] Frazer DM, Anderson GJ. The orchestration of body iron intake: how and where do enterocytes receive their cues?.Blood Cells Mol Dis.2003;30(3):288-297.

[7] Guideline: Intermittent Iron and Folic Acid Supplementation in NonAnaemic Pregnant Women. Geneva: World Health Organization; 2012. Available from: https://www.ncbi.nlm.nih.gov/books/NBK299510/.

[8] Goonewardene IMR, Senadheera DI. Randomized control trial comparing effectiveness of weekly versus daily antenatal oral iron supplementation in preventing anemia during pregnancy. J Obstet Gynaecol Res. 2018;44(3):417-424.

[9] Sipra B, Shanti S, Kimmi A. Effect of weekly iron supplementation on iron indices in pregnant women. Int J Med Res Health Sci. 2015;4(4):857-860.

[10] Sadighian F, HaydehSamiei H, Alaoddolehei H, Kalantari N. Efficacy of daily versus intermittent administration of iron supplementation in anemia or blood indices during pregnancy. Caspian J Intern Med. 2013;4(1):569-573.

[11] World Health Organization(WHO), (2011): The global prevalence of anemia in 2011. Geneva: World Health Organization. Cochrane Database Syst Rev.,110.1002/14651858.CD009997.pub2.

[12] Mumtaz Z, Shahab S, Butt N, Rab MA, DeMuynck A. Daily iron supplementation is more effective than twice weekly iron supplementation in pregnant women in Pakistan in a randomized double-blind clinical trial. The Journal of nutrition. 2000 Nov 1;130(11):2697- 702.

[13] Khangura RK, Torti S, Tesfay L, Hammer E, Bakaysa S, Campbell W. Daily vs. Intermittent iron Therapy in Moderate Iron Deficient Pregnant Patients: A Randomized non-Inferiority Trial. AJOG. February 2021; 224(2), Supplement, S28. DOI: https://doi.org/10/1016/j.ajog.2020.12.114

[14] Chu Lam MT, Khandakar B, Heon I, Overbey J, Brustman L, Rosenn B. Daily vs. Alternate Day Iron for Pregnant Women

with Iron Deficiency Anemia: Randomized Controlled Trial. AJOG. February 2021; 2024(2), Supplement, S107. DOI: https://doi.org/10/1016/j.ajog.2020.12.179

[15] Yaznil MR, Lubis MP, Lumbanraja SN, Barus MNG, Sarirah M. Comparison of maternal outcomes of daily and weekly iron tablet supplementation in pregnant women in Coastal Region, Medan, Indonesia. Open Access Maced J Med Sci. September 2020; 8(B):1088-91 DOI.org/10.3889/oamjms.2020.5056

[16] Abdelgawad M, Mansour D, Mohammed M. Daily versus weekly oral iron supplementation in pregnant women: A randomized controlled clinical trial. Evidence Based Women's Health Journal 2021;2(2):120-126. DOI:10.21608/ebwhj.2019.17526.1031

[17] Demuth IR, Martin A, Weissenborn A. Iron supplementation during pregnancy - a cross-sectional study undertaken in four Germanstates. BMC Pregnancy Childbirth. 2018;18(1):491.

[18] Bouzari Z, Basirat Z, Zeinal Zadeh M, Cherati SY, Ardebil MD, Mohammadnetaj M, Barat S. Daily versus intermittent iron supplementation in pregnant women. BMC Res Notes. 2011 Oct 25;4:444.

[19] Kumar S, Dubey N, Khare R. Study of serum transferrin and serum ferritin during pregnancy and their correlation with pregnancy outcome. Int J Med Sci Public Health. 2017;6:118-22 DOI.org/10.5455/ijmsph.2017.04072016570