Saudi Journal of Biological Sciences (2016) **23**, 724–730

King Saud University

Saudi Journal of Biological Sciences

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ORIGINAL ARTICLE

Weekly iron folic acid supplementation plays differential role in maintaining iron markers level in non-anaemic and anaemic primigravida: A randomized controlled study

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Received 11 March 2015; revised 24 August 2015; accepted 1 September 2015
Available online 5 September 2015

KEYWORDS

Anaemia;
Iron folic acid supplementation;
Iron status markers;
Pregnancy

Abstract Anaemia during pregnancy is most commonly observed and highly prevalent in South-East Asia. Various effective programmes have been laid down for its management, mainly daily supplementation of iron folic acid (IFA) tablets. Following the same, standard obstetrical practice has included the IFA supplementation without requiring the determination of iron deficiency. In this study, a total of 120 primigravida ($N = 60$; non-anaemic (Hb > 11 g/dl) and $N = 60$ anaemic (Hb = 8–11 g/dl)) were selected among those attending the Antenatal Clinic in Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India. They were supplemented with daily and weekly IFA tablets till 6 weeks postpartum. Corresponding changes in haemoglobin level on advance of pregnancy, side effects and compliance

Abbreviations: DISG, daily IFA supplementation group; Hct, haematocrit; Hb, haemoglobin; HsCRP, high sensitivity C-reactive protein; IFA, iron folic acid; MCH, mean corpuscular haemoglobin; MCV, mean corpuscular volume; RBC, red blood cell; sTfR, soluble transferrin receptors; WISG, weekly IFA supplementation group

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Peer review under responsibility of King Saud University.

Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.sjbs.2015.09.007

associated with daily and weekly IFA supplementation and its associations with iron status markers were studied. The inflammatory markers were also estimated. The statistical significance level ($p < 0.05$) between the groups were assessed by applying unpaired t-test using SPSS (version 16.0). The obtained results publicized the salutary role of daily IFA supplementation in improving the haemoglobin level and iron status markers in anaemic pregnant women though the levels could not reach up to the non-anaemic haemoglobin levels. However, weekly IFA supplementation seems to be a better approach in non-anaemic pregnant women where almost comparable results were obtained in terms of haematological parameters, gestation length and birth weight.

Conclusion: Weekly IFA supplementation found to be as effective as daily supplementation in iron sufficient non-anaemic pregnant women whereas anaemic pregnant women should be prescribed daily IFA supplementation irrespective of iron replete/deplete state.

1. Introduction

Almost all over the world daily oral iron supplementation is routinely prescribed during the pregnancy irrespective of deplete or replete iron status at pre-conception or post-conception and the average dose range is 60–120 mg supplemental iron per day as recommended by The International Anaemia Consultative Group (Stoltzfus and Dreyfuss, 1999). The upper dose range is recommended where there is a high prevalence of anaemia among pregnant women. In India, anaemia is highly prevalent in pregnant as well as non-pregnant women (>50% are anaemic) (De Benoist et al., 2008) that resulted in 40% of maternal deaths (Kalaivani, 2009).

Iron deficiency is one of the underlying causes of anaemia during pregnancy (De Benoist et al., 2008) and is one of the 15 leading contributors to the global burden of disease (WHO and CDCP, 2004). Regulation of iron is a highly sophisticated phenomenon where its imbalance could result into significant morbidity and mortality. The disturbed intricate balance during iron regulation may either result in iron deficiency or iron overload, out of which iron deficiency is most commonly observed (Zimmermann and Hurrell, 2007). Iron deficiency anaemia is the most common nutritional disorder prevalent both in developed and developing countries particularly in pregnant women of developing countries (WHO, 2001). This is due to iron deficit intake of diet that could not meet the increased iron demand for the developing foetus (Zimmermann and Hurrell, 2007). According to World Health Organization (WHO, 2001) around 2 billion people who count approximately 30% of the world population is anaemic; pregnant women contributes approximately 41.8% of this anaemic polulation (De Benoist et al., 2008).

The most common strategy for the management of this staggering situation is to start oral iron supplementation during pregnancy. In India, a National Nutrition Policy was adopted in 1993 to reduce prevalence of anaemia and the supplementation interventions include daily supplementation of $FeSO_4$ containing 100 mg elemental iron tablet and 500 μg folic acid for 100 days during pregnancy followed by the same dose for 100 days in the postpartum period (Guidelines for control of iron deficiency anaemia, 2013).

During the advance of pregnancy, plasma volume expands resulting in the decreased haematocrit and Hb levels resulting in the fluctuations in the values. Thus, the reliability of Hb measurement and haematocrit diminished (Bentley, 1985). Ferritin level, an indicator of iron storage decreased during the gestation but its level was found elevated in inflammatory conditions, being an acute phase reactant. Thus, measurement of sTfR along with these parameters would help to detect iron deficiency state more precisely because neither is it an acute phase reactant (Skikne, 1998) nor influenced by hemodilution during pregnancy (Akinsooto et al., 2001). The inflammatory markers like cortisol and high sensitivity C-reactive protein were also studied to ensure the changes in the level of iron markers were true reflection of oral iron supplementation and not influenced by inflammation. Erythropoietin hormone responsible for the expansion of red cell mass whose level continuously increased during the pregnancy that led to the rise in Hb concentration (Barton et al., 1994; McMullin et al., 2003; Milman et al., 1997). Thus measurement of aforementioned markers could reflect the complete iron profile of the body.

Although, the effect of daily versus weekly IFA supplementation on iron status markers during pregnancy has been studied scanty information is available about the amount and regularity of IFA intake in comparison with iron status markers level and also the side-effects associated with different supplementation schemes. Owing to these, the present study was designed to examine the impact of daily versus weekly oral iron supplementation in improving the iron status makers, Hb levels, birth weight and effect on erythropoietin level, gestation length and mode of delivery in anaemic/non-anaemic pregnant women during gestation and postpartum period.

2. Material and methods

2.1. Subjects

The present study comprised a total of 120 pregnant women in their early second trimester (13–16 weeks of gestation) who are yet to start oral iron supplementation. Out of 120, 60 were non-anaemic (Hb > 11 g/dl) women and 60 were anaemic (Hb = 8–11 g/dl) women. The subjects were selected among those attending the Antenatal Clinic in Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India. Pregnant women fulfilling the subject selection criteria, having no chronic morbidity, 20–30 years old primigravida, and belong to middle socio-economic group willing to participate (informed consent obtained) were enrolled in the study. Exclusion criteria include